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# electron

## user

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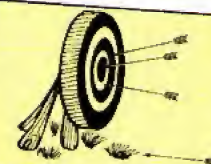
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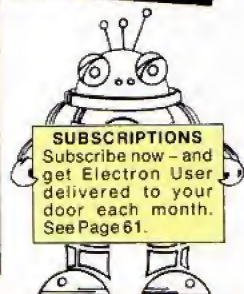
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**Published by Database Publications Ltd**  
Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.  
Telephone: 061-456 8835 (Editorial) 061-456 8383 (Administration) 061-456 8500 (Advertising)  
Subscriptions: 061-480 0171 Telex: 667664 SHARET G Prastel: 814568383

New trade distribution: Europress Sales and Distribution Limited, 11, Brighton Road, Crawley, West Sussex RH10 6AF. Circulation 0293 27053.

Electron User is an independent publication. Acorn Computers Ltd, manufacturers of the Electron, are not responsible for any of the articles in this issue or for any of the opinions expressed.

Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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- (12) UK
- (13) Eire (IR £16)
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# electron user NEWS

## New-look Acorn attacks on four fronts

WITH its financial problems now resolved, Acorn has renewed its attack on the UK market on four fronts.

This is due to the company being restructured following a multi-million pound refinancing package which saw Olivetti take a 49.30 per cent share.

Now under the chairmanship of former British Telecom senior executive, Dr Alexander Reid, Acorn has effectively been split into four divisions – education and training, scientific and industrial, business and consumer.

"We are now more confident of success than we have been for some time", an Acorn spokesman told *Electron User*.

"The sky is the limit now that our financial worries are out of the way".

Meanwhile Dr Hermann Hauser and Chris Curry have taken on the roles of joint deputy chairmen with responsibility for group strategy and line responsibility for product development.

## Electron not to be axed – and that is official

A STRING of allegations that Acorn is about to axe the *Electron* have been strongly denied by the company.

The claims – most of which emanate from sources in the media – assert that once present stocks of the machine have been exhausted the *Electron* will be dropped.

"The *Electron* is here to stay", an official Acorn spokesman told *Electron User*.

"With a user base in excess of 250,000, it is now an accepted product.

"And we as a com-

pany are behind it all the way.

"The allegations have been nothing more than pure speculation based on exaggerated reports of Acorn's problems".

It was just such reports which led recently to a collapse in the share price from its 1984 peak of 193p to only 23p before Acorn itself requested a halt to share dealings.

Now Acorn intends to

strike back at its critics by launching a series of new packages this year, with the first one for the *Electron*.

This will be made up of an *Electron*, Plus One, joystick and ROM cartridge at a cost of £219.

The company has also revealed that the Plus 3 disc and ADFS are also in full production.

"We intend to show people we are commit-

ted to the future of the *Electron*", the official told *Electron User*.

"It's importance will be seen not as a stand alone computer but as a keyboard element of a serious computing system".

It was *The Sunday Times* which got the first few body blows in against Acorn but it was left to *The Observer* to subsequently attempt to put the boot into the *Electron*.

Quoting Chris Curry's words on the launch of the *Electron* that it would become "an essential part of the home", Jim Levi went on to say in *The Observer*:

"But it did not happen. Just 15 months later the *Electron* ceased production and the last few weeks have seen desperate attempts to move the unsold stocks".

An Acorn official said: "It never ceases to amaze me how these people claim to know far more than we do who are in the company.

"Most of the press coverage we have had over this time has been pure rumour and speculation. But it is going to take some time before we are in a position to prove this to everyone's satisfaction".



Acorn strikes back: all this for £219





# Media is blamed for micro industry panic

THE wave of panic which has swept over the UK home computer industry in recent weeks has been blamed on "seriously exaggerated" reports - including several about the Electron - in the British Press.

And Martin Vlieland-Boddy, a leading figure in hi-tech circles, is convinced that the media has hounded Britain's manufacturers, particularly Acorn, to such an extent that it has almost handed the market over to the American competition.

"What they have done with rumours and innuendo is to destroy confidence in the market", he told *Electron User*.

"First the City boys get the jitters, then they are soon followed by the potential customers.

## Exaggerated

"Acorn has suffered far more than most, for they exaggerated any problems the company had to the point that they were accelerated.

"As a result all the other British manufacturers have come under fire. They have kicked the home industry to such an extent that everyone is down".

The former boss of Torch Singled out The Sunday Times as being mainly responsible for the current troubles.

## Culprits

"This normally sensible newspaper has been one of the worst culprits". Vlieland-Boddy insists. "and computer writer Jane Bird must share a considerable degree of blame.

"After all, it was her articles going back to late last year which caused the rot to set in for Acorn.

"Because of them



Jane Bird... "must share a considerable degree of blame".

people began to lose that vital confidence in the company and, as a result, sales were lower at Christmas than they should have been.

"Suddenly a vicious circle has been created which is threatening to ensnare all the British micro manufacturers".

Martin Vlieland-Boddy is currently heading Active Technologies, a public company involved in the merger of successful companies to protect themselves against unstable market conditions.

## MORE SUPER SHOWS

DATABASE Publications is to organise three Electron & BBC Micro User Shows this year.

"Whereas some computer show organisers have been experiencing problems of late - IPC has even cancelled events - we expect once again to break previous attendance records", says Derek Meakin, head of Database.

### Dates and venues:

May 9 to 12: New Horticultural Hall, London SW1.

September 27 to 29: UMIST, Manchester.

November 14 to 17: New Horticultural Hall, London SW1.

Show contacts: Christine Lees/Pam Goodwin, Database Publications. Tel: 061-429 8157.



## Joystick that sees double

A SINGLE joystick that thinks it's two has been produced by Voltmace.

The firm's Delta 3B single has been modified to include connection to both pairs of analogue channels of the computer.

It will work with programs written for either a left or right joystick, and if a program has been designed for two players using different joysticks it can be played by passing the joystick from one player to the other.

The joystick costs £12 and operates on the Electron with any analogue interface.

## Aid for handicapped

MINI Office, the chart topping business package for the Electron from Database Software, has been officially endorsed as an aid for the handicapped.

The software is specifically recommended in "Micros for Handicapped Users", a book published by Helena Press of Whitby Yorkshire. It carries a foreword by Baroness Masham of Iton.

Revolutionarily priced at £5.95 - business packages can cost up to several hundred pounds

- Mini Office is a suite of four programs.

All professionally written, they are made up of a word processor, database, spreadsheet and graphics.

The software package is singled out in the book in the chapter "Jobs for housebound people", which deals with the handicapped contemplating setting up their own businesses.

"We found Mini Office very useful". Peter Saunders of Helena Press told *Electron User*.





## REWRITE THE HIGH SCORE TABLES

So, you've got an Electron. You've also got enemies. With the Gunshot, you'll have all the opposition cowering in corners. 8-directional action and an all-in-one moulded stem allows accurate annihilation and strength to survive those all-night sessions. Dual fire buttons for fading fingers (and a rapid fire version when they're really coming thick and fast). And, if you break it (and we know you'll try) our 12-month guarantee will prove invaluable. Only £8.95. For the Gunshot, Vulcan's totally hardware Electron interface comes with a free tape which converts all keyboard software for joystick use. And it'll allow you to destroy BBC game enemies on your Electron, too! £19.95, 12-month guarantee

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IF you're a teenager AND  
not in love THEN you may  
as well read this...

Last month we saw how  
logical variables could be used  
to store the results of com-  
parisons. These results always  
took the values 0 and -1, with  
0 meaning that the condition  
was false while -1 indicated  
that the comparison was true.

These two values were held  
in the pseudovariables TRUE  
and FALSE.

Finally we saw how two  
conditions could be joined  
together to make up one larger  
condition using the AND  
logical operator.

Program I shows all these in

```
10 REM PROGRAM I
20 INPUT "Age",age
30 tooyoung= age<13
40 tooold= age>19
50 teenager=age>=13 AND
age<=19
60 IF teenager THEN
PRINT "You're a teenager!"
70 IF tooyoung THEN
PRINT "You'll be a teenager
when you're older."
80 IF tooold THEN PRINT
"You're past it!"
```

Program I

action as it decides whether or  
not you are a teenager.

What happens depends on  
the value you put into the  
variable age. If age is less than  
13 then line 30 notes this fact  
and it is recorded in the logical  
variable *tooyoung*.

Similarly if age is over 19  
then line 40 gives *tooold* the  
value -1. (In passing, notice  
that if one is true the other  
must be false. You can't be  
both too young and too old to  
be a teenager.)

You can only be a teenager  
if your age is between 13 and  
19. Hence the structure of line  
50 which subjects age to two  
comparisons joined by AND.

Only if age is both 13 or  
more and also 19 or less can it  
be true that you are a  
teenager. Hence *teenager* is  
only true if *age>=13 AND*

*age<=19* is true.

The remaining lines of the  
program print out the appro-  
priate message depending on  
which of the logical variables  
*tooold*, *tooyoung* or *teenager*  
is true.

As you can see, the choice  
of sensibly named logical  
variables make the last lines  
read almost like English.

Don't worry too much if line  
50 looks a little odd. You can, if  
you want, make things clearer  
by enclosing the multiple  
condition in brackets as in:

```
50 teenager= (age)=13
AND age<=19)
```

Now you can see more  
clearly that it is the result of  
the ANDing of both com-  
parisons that is stored in  
*teenager*.

The AND operator is again  
in action in Program II. This  
asks for the price of an item  
and then for how much money

```
10 REM PROGRAM II
20 INPUT "Price", price
30 INPUT
"Money",spendingmoney
40 cheap=0
50 gottenough=0
60 IF price<50 THEN
cheap=-1
70 IF
spendingmoney>price THEN
gottenough=-1
80 IF cheap AND
gottenough THEN PRINT "Buy
it."
```

Program II

you can spend.

It then tells you that you can  
buy the item but only if it is  
both cheap and within your

```
10 REM PROGRAM III
20 INPUT "Price", price
30 INPUT
"Money",spendingmoney
40 cheap=FALSE
50 gottenough=FALSE
60 IF price<50 THEN
cheap=TRUE
70 IF
spendingmoney>price THEN
gottenough=TRUE
80 IF cheap AND
gottenough THEN PRINT "Buy
it."
```

Program III

disposable income (credit card  
companies don't like this type  
of program).

Lines 40 and 50 set up two  
variables, *cheap* and  
*gottenough*, giving them both  
values of zero. Line 60 then  
sets *cheap* to -1 if price is less  
than 50.

Similarly, the next line gives  
*gottenough* the value -1 if your  
spending money covers the  
price.

Notice that *cheap* and  
*gottenough* are both being  
used as logical variables.

The final line ANDs *cheap*  
and *gottenough*. If, and only if,  
both are true, then the  
message will be printed.

It's no good if you have  
enough money but the item  
isn't cheap. Nor is it any good if  
the item is cheap but you don't

have enough money.

Both conditions have to be  
true before the rest of the line  
after the THEN is obeyed.

Rather than use the values  
0 and -1 in Program II we  
could have used TRUE and  
FALSE. Program III shows  
how this is done.

Notice how much clearer  
this is than the earlier pro-  
gram. However it can still be  
improved, as in Program IV.

This listing does away  
with lines 60 and 70 of the  
previous program. Instead  
lines 40 and 50 do the  
comparisons and store the  
results directly in the logical  
variables *cheap* and  
*gottenough*.

Not only does this save time  
and memory space, it makes  
the program even clearer.

As we've seen, the joint  
condition formed by two

```
10 REM PROGRAM IV
20 INPUT "Price", price
30 INPUT
"Money",spendingmoney
40 cheap=price<50
50
gottenough=spendingmoney>pr
ice
80 IF cheap AND
gottenough THEN PRINT "Buy
it."
```

Program IV

conditions linked by an AND is  
only true if both the subsidiary  
conditions are true.

It's no good the first  
condition being true while the

# EOR... a logical operator we don't meet so often

## From Page 9

second is false. It's no good the second condition being true when the first is false. Both conditions have to be true for the overall condition formed by the AND to be true.

In many ways this is common sense. It's the way we use AND in our everyday life... "I won't go sunbathing unless it is sunny and warm".

Both subsidiary conditions have to be met before the total

you're lucky and, at the same time, it's true that I've nothing better to do. Only if both conditions are true will you have the pleasure of my company.

The second case is very different. As before if both

first condition	second condition	joint condition
TRUE	TRUE	TRUE
TRUE	FALSE	FALSE
FALSE	TRUE	FALSE
FALSE	FALSE	FALSE

Table II: OR truth table

first condition	second condition	joint condition
TRUE	TRUE	TRUE
TRUE	FALSE	FALSE
FALSE	TRUE	FALSE
FALSE	FALSE	FALSE

Table I: AND truth table

condition is fulfilled.

If you think about it, you'll see that there are only four possible combinations in our AND condition.

Both minor conditions can be true, both can be false, the first can be true while the second is false or the first can be false while the second is true.

Table I sums up these possible minor conditions and the results they have on the major condition. It's called the AND truth table.

In real life, however, we don't just stick to conditions such as "If you're lucky and I've nothing better to do then I'll come with you".

We also use conditionals such as "If you're lucky or I've nothing better to do then I'll come with you".

Notice the difference between them. In the first case I'll only be coming if it's true that

conditions are true (you're lucky and I've nothing better to do) I'll be coming. There are, however, two other positive results.

It may be the case that while you aren't very lucky I

```
10 REM PROGRAM VI
20 INPUT "Coffee
temperature", temp
30 INPUT "Coffee price",
price
40 hot=temp>50
50 cheap=price<40
60 IF hot OR cheap THEN
PRINT "Drink it!"
```

Program VI

have nothing better to do so I'm coming with you (There, your luck's changed!). Alternatively I may have better things to do but you're lucky, so I come.

As you can see, using the "or" instead of the "and" in the above sentences makes a lot of difference. And, as you might have guessed, we can produce these sort of conditionals using Basic. In this case we used the aptly named OR logical operator.

Program V shows OR in action. This again tests age but, to make up for before, it's the teenagers who are left out.

Here the three logical variables *younger*, *older* and

```
10 REM PROGRAM V
20 INPUT "Age", age
30 younger= age<13
40 older= age>19
50 teenager=age=13 AND
age<=19
60 IF younger OR older
THEN PRINT "You can come."
70 IF teenager THEN
PRINT "Go away."
```

Program V

*teenager*, are used to store the results of the tests on *age*.

Line 60 introduces the OR operator. Now if either *younger* or *older* or both are true then the rest of the line after the THEN is performed.

Actually in this case it's impossible for both minor conditions to hold good, as you can't be both younger and older than a teenager.

The point to grasp is that only one of the two minor conditions has to be true for the whole major condition to be true.

If neither of these conditions is true then *teenager* has to be true, so the rude message is printed.

Program VI again shows OR in action.

If the temperature of the coffee is over 50 then the logical variable *hot* will be true. If the coffee costs less than 40 then *cheap* will be set to true.

The OR in the joint condition of line 60 allows the message to be printed out if either or both conditions is true.

You'll notice from this that the OR logical operator is much more generous than the AND.

Whereas an AND combination is only true for one of the four possible cases, the OR operator is true for three of the combinations. Table II shows the truth table for OR.

Try using it to figure out what's happening in Program VII which tests a list of data for numbers that are either 12 OR greater than 10.

Notice that only one of the conditions has to be true for the message to be printed.

There's one more logical

operator to deal with, but before we come to that try swapping the ANDs and the ORs of the previous programs and see how they affect the results.

So far the two logical operators we've come across have been reasonably familiar. Both the AND and the OR operators are more or less the same as we've met in our everyday life.

As ever, the computer treats them rather more strictly than we do but they do conform to common sense.

Now, however, we're going to meet another logical

```
10 REM PROGRAM VII
20 FOR loop=1 TO 5
30 inrange=FALSE
40 READ test
50 IF test=12 OR test>10
THEN inrange=TRUE
60 IF inrange THEN PRINT
test; "is either equal to 1
2, greater than 10 or both"
70 NEXT loop
80 DATA 9,12,5,17,23
```

Program VII

operator which we don't meet all that often. It's the exclusive-or or EOR operator.

Happily it's not all that difficult to understand. Table III shows its truth table.

In the case of two subsidiary conditions linked by an EOR the overall condition is only true if one but not the other of the two subsidiary conditions is true.

If both conditions are true then the overall condition is,



contrarily, false.

In other words, the joint condition is only true if one, and only one, of the minor conditions is true.

At first this seems a little unreal, but it does mirror everyday life. Consider the case of:

IF you're good looking  
EOR you're rich  
THEN I'll marry you

Here the marriage will only take place if the prospective spouse is good looking but not rich or, alternatively, rich but

```
10 REM PROGRAM VIII
20 INPUT "Weight",weight
30 INPUT "Length",length
40 heavy=weight>50
50 long=length>60
60 IF long EOR heavy THEN
PRINT "I'll help you carry it."
```

Program VIII

ugly. If the spouse is ugly and poor the nuptials are cancelled.

first condition	second condition	joint condition
TRUE	TRUE	FALSE
TRUE	FALSE	TRUE
FALSE	TRUE	TRUE
FALSE	FALSE	FALSE

Table III: EOR truth table

Similarly if the spouse is good looking and rich the wedding is off (they'd be too bigheaded to live with!).

I agree that it's a strange example, but in computing we often come across cases where EOR is useful. Take a look at Program VIII.

Here I'm willing to carry the parcel if it's heavy but not too long. I'm even willing to carry it if it is cumbersome, so long as it's not too heavy.

If it's neither heavy nor cumbersome you can carry it yourself. And if it's heavy and cumbersome find someone else to do your dirty work.

Again, it's not the world's most likely example, but take my word for it. EOR is an extremely useful logical operator.

You'll come across it a lot in your computing career. See if you can figure out what it's

```
10 REM PROGRAM IX
20 FOR loop=1 TO 4
30 inrange=FALSE
40 READ first,second
50 IF first(10 EOR second
>20 THEN inrange=TRUE
60 IF inrange THEN PRINT
"Either 'first' is less th
an 10 or 'second' is grea
ter than 20 but not both at
the same time."
70 PRINT
80 NEXT loop
90 DATA 9,12,7,23,15,19,
16,25
```

Program IX

doing in Program IX.

And that's it for this month. Next month we'll be looking at one more logical operator. What ELSE!

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SOME of the methods available for sorting data, either string or numeric, into order were explored by Paul Hutson and I in the September 1984 issue of *Electron User*.

Once the data has been placed in a table and sorted there is often a need at some stage to search for a particular item.

There are several ways of searching tables, depending on how they are ordered, the simplest method being a linear search.

This involves starting at the beginning and working through to the end, looking at each item in turn to see if it is the one you want.

This method is adequate for small tables but is very inefficient when large amounts of data have to be processed.

For example how would you look up the telephone number of Mr Smith or Mr Jones in a telephone directory?

Would you start at the beginning and look at each name until you came to the one you wanted - a linear search? I cannot imagine anyone doing that.

Most people would open the directory somewhere in the middle, at M say. If you were looking for Smith, the

# Doing things by halves

**ROLAND WADDILOVE explains an efficient way to search ordered data**

first half up to M would be ignored.

You could then divide the remainder in half again, opening it at R or S. It is then relatively easy to find the person you are looking for.

This method of searching by repeatedly dividing the list or table into two is called a binary search. It is plainly a much superior method as far fewer steps are required.

How can this method be put in a form which the Electron can understand?

Suppose you had a simple telephone directory program. You would need three arrays to store the information - `name$(100)`, `address$(100)`, `number$(100)`.

These would be dimensioned at the start of the program and the data loaded from disc or tape.

The address and telephone number would be required for any name entered. Listing 1 shows how this can be done using the binary search method.

Line 1010 sets the first and last names to be considered. Line 1020 sets found to be FALSE.

Line 1040 finds the middle of the list. A check is first made to see if the person has been found, line 1050.

If the name in the middle is greater than the person's name then the person must come before this, so *last* is set to *middle - 1*, line 1060.

If the middle name is less than the person's name, then ignore the first half by setting *first* to *middle + 1*, line 1070.

This process is repeated until the person's name is found.

What will happen if the name is not in the file? *found* will never be set to TRUE and the routine will loop forever. Some sort of check is needed.

If you follow through the

routine you will see that every time lines 1040 to 1070 are repeated and the person's name is not found, either *last* is decreased to *middle - 1*, or *first* is increased to *middle + 1*.

Eventually *first* will become greater than *last*. This is when we need to stop.

Listing II shows how this is done. Another flag is used, *no-name*, which is set to TRUE when *first* becomes greater than *last*.

These programs are not complete, and the procedures could be coded more efficiently, but they show the method quite clearly.

Program I sets up an array containing 1,000 different strings. Ten random strings are placed in another array.

Linear and binary searches are carried out for the 10 strings and the average time taken is calculated.

The searches are carried out for different numbers of items and the results plotted on a graph.

Run the program several times and notice how sharply the time taken increases with a linear search. The time taken for a binary search seems almost independent of the number of items.

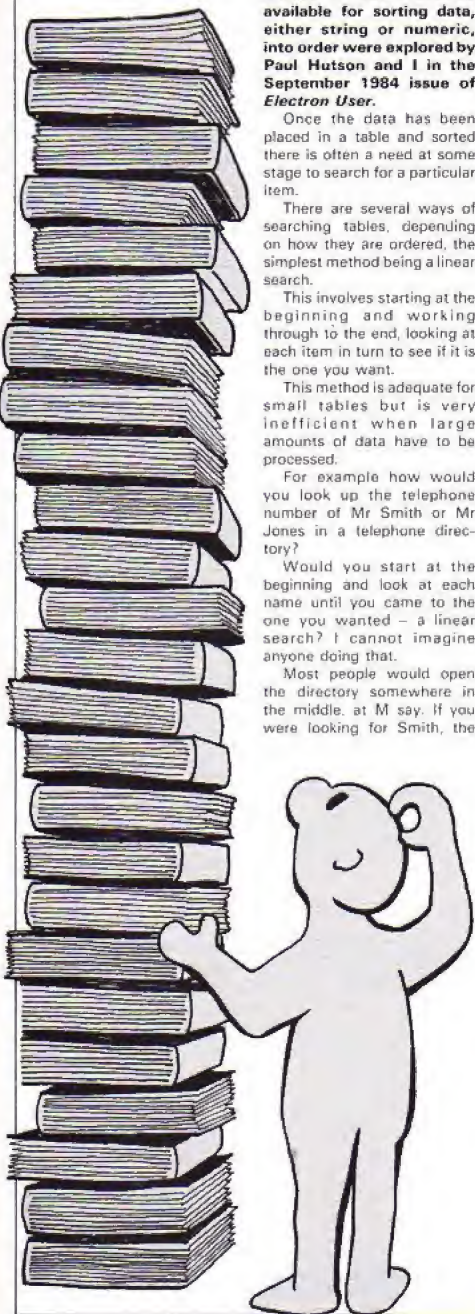
The linear search curve is anything but smooth. It all depends on where the string is in the table, near the start or the end.

The difference between the two methods is apparent from the graph.

The average number of steps for a linear search is  $n/2$ , where  $n$  is the number of items in the table.

The average number of steps for a binary search is  $\log_2 n$ .

So doubling the number of entries will require only one more step with this method. Table I shows some sample values.

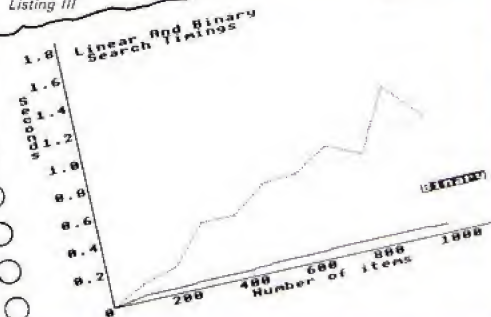




Number of items	Linear search	Binary search
n	Average number of steps = $n/2$	Average number of steps = $\log_2 n$
4	2	2
8	4	3
16	8	4
32	16	5
64	32	6
128	64	7
256	128	8

Table 1: Relationships between number of items and steps

Listing III



```

999 REM LISTING I
1000 DEF PROCfind_number(p
erson$)
1010 first=1 : last=number
_of_names
1020 found=FALSE
1030 REPEAT
1040 middle=(first+last)/2
1050 IF name$(middle)=pers
on$ THEN found=TRUE
1060 IF name$(middle)>pers
on$ THEN last=middle-1
1070 IF name$(middle)<pers
on$ THEN first=middle+1
1080 UNTIL found
1100 PRINT "person$;address
(middle);number(middle)"
1120 ENDPROC

```

Listing I

```

999 REM LISTING II
1000 DEF PROCfind_number(p
erson$)
1010 first=1 : last=number
_of_names
1020 found=FALSE : no_name
=FALSE
1030 REPEAT
1040 middle=(first+last)/2
1050 IF name$(middle)=pers
on$ THEN found=TRUE
1060 IF name$(middle)>pers
on$ THEN last=middle-1
1070 IF name$(middle)<pers
on$ THEN first=middle+1
1080 IF first>last THEN no
_name=TRUE
1090 UNTIL found OR no_name
=TRUE
1100 IF found THEN PRINT "p
erson$;address(middle);numb
er(middle)"
1110 IF NOT found THEN PRI
NT "person$; not in file."
1120 ENDPROC

```

Listing II

```

10 REM Linear/Binary
20 REM Search Timings
30 REM By R.A.Waddilove
40 REM LISTING III
50 MODE 4
60 PROCinitialise
70 FOR maxI=100 TO 1000
STEP 100
80 PROCrandom_words
90 PROClinear_search
100 PROCbinary_search
110 PROCplot_times
120 NEXT
130 VDU 7
140 END
150 DEF PROCinitialise
170 #FX16,0
180 PRINT TAB(15,15);"Thi
nking..."
190 VDU 23,1,0;0;0;0;
200 VDU 19,1,3;0;
210 DIM word$(1000),find$
(10)
220 FOR IX=1 TO 1000
230 word$(IX)=STR$(IX+100
0000)
240 NEXT
250 CLS:VDU 28,0,30,1,5
260 PRINT "S e c o n d s"
270 VDU 26
280 PRINT TAB(6,1);"Linea
r And Binary";TAB(7,2);"Sea
rch Timings"
290 COLOUR 129;COLOUR 0
300 PRINT TAB(34,1);"Line
ar";TAB(34,24);"Binary":VDU
30
310 COLOUR 1;COLOUR 128;V
DU 29,140;70;
320 MOVE 0,1000;DRAW 0,0;
DRAW 1200,0
330 VDU 5
340 #Z=4002010A
350 FOR i=100 TO 900 STEP
100
360 MOVE -100,i+32;PRINT;
1/500
370 NEXT
380 #Z=400090A
390 FOR IX=200 TO 1000 ST
EP 200
400 MOVE IX-32,-8;PRINT;1
/5
410 NEXT
420 MOVE 400,-46
430 PRINT "Number of item
s"
440 MOVE -32,0;PRINT "0"
450 VDU 4
460 oldltime=0;oldbinti
me=0
470 ENDPROC
480
490 DEF PROCrandom_words
500 FOR IX=1 TO 10
510 find$(IX)=STR$(RAND(
maxI)+1000000)
520 NEXT
530 ENDPROC
540
550 DEF PROClinear_search
560 TIME=0
570 FOR IX=1 TO 10
580 JZ=0
590 REPEAT JZ=JZ+1
600 UNTIL word$(JZ)=find$
(IX)
610 NEXT
620 ltime=TIME-DIV 10
630 ENDPROC
640
650 DEF PROCbinary_search
660 TIME=0
670 FOR IX=1 TO 10
680 FI=1;LI=maxI
690 REPEAT MI=(FI+LI)/DIV2
700 IF word$(MI)>find$(IX)
) LI=MI-1
710 IF word$(MI)<find$(IX)
) FI=MI+1
720 UNTIL word$(MI)=find$
(IX)
730 NEXT
740 btime=TIME-DIV 10
750 ENDPROC
760
770 DEF PROCplot_times
780 MOVE maxI-100,5;oldli
ntime
790 PLOT 21,maxI,5;oldbi
ntime
800 MOVE maxI-100,5;oldbi
ntime
810 DRAW maxI,5;btime
820 oldltime=ltime
830 oldbtime=btime
840 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Hello—  
what have  
we here?

```
10 PRINT "HELLO"  
20 GOTO 10
```

This month's notebook looks at a program that does exactly the same thing but using assembly language and an operating system routine.

## 10.20

30

40

50

50

2

90

0.1

2

1

15

-19

Trevor Roberts

```

10 REM HELLO AGAIN
20 MODE 6
30 OSWRCH=AFEEE address to store
40 PX=2000 assembled code
50 [
60 LDA #ASC("H")
70 JSR OSWRCH
80 LDA #ASC("E")
90 JSR OSWRCH
100 LDA #ASC("L")
110 JSR OSWRCH
120 LDA #76
130 JSR OSWRCH
140 LDA #79
150 JSR OSWRCH
160 LDA #13 new line
170 JSR OSWRCH
180 LDA #10 cursor left
190 JSR OSWRCH
200 RTS return from subroutine
210 ]
220 PRINT "PRESS SPACE"
230 wait$=GET$
240 CLS
250 REPEAT
260 CALL 2000 runs machine
270 UNTIL FALSE code routine
found at 2000

```



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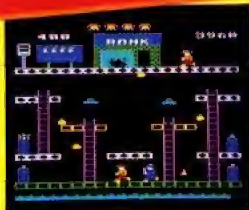
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2	FORD	41.42	41.42	41.42	
3	WILL	41.78	41.78	41.78	
4	WILLIAM	41.78	41.78	41.78	
5	WILLIAM	41.78	41.78	41.78	
6	WILLIAM	41.78	41.78	41.78	
7	WILLIAM	41.78	41.78	41.78	
8	WILLIAM	41.78	41.78	41.78	
9	WILLIAM	41.78	41.78	41.78	
10	WILLIAM	41.78	41.78	41.78	
11	WILLIAM	41.78	41.78	41.78	
12	WILLIAM	41.78	41.78	41.78	
13	WILLIAM	41.78	41.78	41.78	
14	WILLIAM	41.78	41.78	41.78	
15	WILLIAM	41.78	41.78	41.78	
16	WILLIAM	41.78	41.78	41.78	
17	WILLIAM	41.78	41.78	41.78	
18	WILLIAM	41.78	41.78	41.78	
19	WILLIAM	41.78	41.78	41.78	
20	WILLIAM	41.78	41.78	41.78	

## DATABASE

RECORD NO. 1	RECORD NO. 1
SURNAME: JONES	SURNAME: ANDREWS
FIRST NAME: SYMON	FIRST NAME: JAMES
ADDRESS1: 8 BAGGE LANE	ADDRESS1: 12 ELF ROAD
ADDRESS2: LEVERPOOL	ADDRESS2: HEPFORD
TELEPHONE: 021-621750	TELEPHONE: 021-627451
AGE: 40	AGE: 13
RECORD NO. 2	RECORD NO. 2
SURNAME: ANDREWS	SURNAME: ANDREWS
FIRST NAME: PETER	FIRST NAME: PETER
ADDRESS1: 12 ELF ROAD	ADDRESS1: 12 ELF ROAD
ADDRESS2: HEPFORD	ADDRESS2: HEPFORD
TELEPHONE: 021-627451	TELEPHONE: 021-627451
AGE: 19	AGE: 19
RECORD NO. 3	RECORD NO. 3
SURNAME: SMITH	SURNAME: SMITH
FIRST NAME: JANE	FIRST NAME: JANE
ADDRESS1: 42 HIGH STREET	ADDRESS1: 15 ROLL ROAD
ADDRESS2: BULLHORN	ADDRESS2: WARRINGTON
TELEPHONE: 021-61421	TELEPHONE: 093-81922
AGE: 27	AGE: 70
RECORD NO. 4	RECORD NO. 4
SURNAME: VATES	SURNAME: BROWN
FIRST NAME: IAN	FIRST NAME: IAN
ADDRESS1: 177 FORD ROAD	ADDRESS1: 17 LEAMING
ADDRESS2: BULLHORN	ADDRESS2: NORTHCH
TELEPHONE: 021-627451	TELEPHONE: 021-627451
AGE: 25	AGE: 21
RECORD NO. 5	RECORD NO. 5
SURNAME: ANDREWS	SURNAME: ANDREWS
FIRST NAME: JAMES	FIRST NAME: JAMES
ADDRESS1: 12 ELF ROAD	ADDRESS1: 12 ELF ROAD
ADDRESS2: HEPFORD	ADDRESS2: HEPFORD
TELEPHONE: 021-627451	TELEPHONE: 021-627451
AGE: 17	AGE: 11

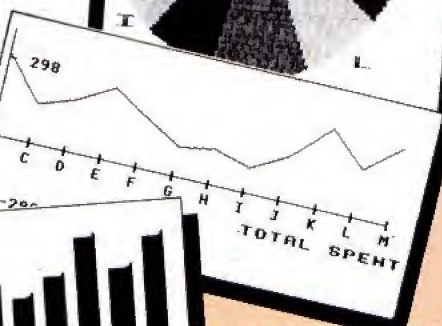
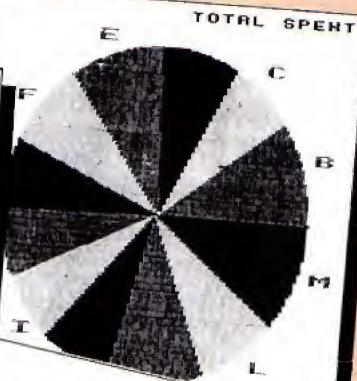
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DATABASE SOFTWARE

# Close encounters

By NIGEL PETERS

HAVE you ever wondered how computer games work? We've already seen how to make an alien hurtle round the screen in the September 1984 Program Probe, which featured Program 1.

It's nice, but just moving an alien around the screen soon gets boring.

What's missing are things to bump into, or, rather, things to avoid bumping into. We need a way of detecting collisions.

One way of doing this is to use the Basic function POINT. What this does is to tell you the logical colour number of any point on the screen.

This may not seem very relevant, but all will be made clear. First, however, we'll investigate POINT a little more deeply. Run Program 11.

```
10 REM PROGRAM 11
20 MODE 1
30 FOR loop=1 TO 4
40 READ leftx,lefty,rightx,righty
50 PROCWindow(leftx,lefty,rightx,righty,loop)
60 NEXT loop
70 VDU 26
80 DATA 100,100,900,900
90 DATA 200,200,800,800
100 DATA 300,300,700,700
110 DATA 400,400,600,600
120 END
130 DEFPROCWindow(a,b,c,d,loop)
140 VDU 24,a,b;c;d;
150 GCOL 0,128+loop-1
160 CLG
170 ENDPROC
```

Program 11

All this does is use VDU24 to set up and clear four screen windows, each to a different colour. If you don't follow this then refresh your memory with the May 1984 Program Probe. The outer window is black, the next is red, followed by yellow and, finally, the centre is white. All four colours allowed in Mode 1 are displayed on the screen. Figure 1 shows the coordinates of the windows.

As you know, the Electron deals with everything as a number. Each of these four

colours is referred to by a code number known as its logical colour number.

As there are four logical colours available in Mode 1, so the logical colour numbers range from 0 to 3.

0 is black, 1 is red, 2 is yellow and 3 is white.

You can change these default colours with a cunning VDU19, but the numbers remain the same. There can only be four colours on screen at once and each is referred to by a number between 0 and 3.

As I said before, we can use POINT to give us the logical colour number of any point on the screen.

PRINT POINT (x,y)

will return the logical colour number of the screen at graphics coordinates x,y. Try using it on the screen set up by Program 11.

PRINT POINT(150,150)

should give you the figure 0 as POINT points to a point in the black part of the screen (if you take my point). The logical colour of black is 0 so 0 is duly returned. Similarly:

PRINT POINT(250,250)

and

PRINT POINT(350,350)

should return 1 and 2 respectively.

PRINT POINT(450,450)

is examining part of the white

square, so 3 is returned. I leave it to you to find out what POINT (x,y) returns when the x and y coordinates are outside the screen range of 1023 and 1279.

Now that we're familiar with what POINT does, let's see how it can be used to detect collisions.

Going back to Program 1, you'll remember that our little alien was buzzing around on a Mode 1 screen. The alien appeared in white, the background was black.

Thinking about it, if we POINTed at the alien we should get 3 returned. If we did the same for the black background 0 should be returned.

Mode 1 has four colours available. At the moment Program 1 is ignoring logical colours 1 and 2.

Now suppose we drew some obstacles on the screen in, say, yellow, logical colour 2.

The alien would have to avoid these yellow obstacles. If it tried to move onto a part of the screen that was yellow, not black, there'd be a collision.

Put another way, if the alien's next move tries to put it on a bit of screen of logical colour 2 instead of logical colour 0 there's a collision.

You can probably see where this is leading to. To know if the next move is going to result in a collision we have to know the logical colour of the next position of the alien.

And that is what POINT does. It looks at the screen and tells us what logical colour is there.

So when we want to move our alien we calculate the new values of x and y and use POINT (x,y) to see what colour the screen is at x,y.

If 0 is returned the screen is black, so the alien can safely move there. If the result is 2 then the screen is yellow and the alien will collide with an obstacle.

So detecting collisions is quite simple. If you think about it, the objects have to be a different colour from the back-

```
10 REM PROGRAM 1
20 REM BY IAN RODGERS
30 REM use cursor keys
40 MODE1
50 VDU23,1,0;0;0;0;
60 VDU23,224,24,60,126,2
19,126,36,66,129
70 X=0
80 Y=0
90 REPEAT
100 PRINTTAB(X,Y)CHR$224
110 FOR delay=1 TO 100:NE
120 IF INKEY=(-122) THEN X=X+1:PRINTTAB(X-1,Y)*" :IF
130 IF INKEY=(-26) THEN X=X-1:PRINTTAB(X+1,Y)*" :IF X=-1 THEN X=0
140 IF INKEY=(-42) THEN Y=Y+1:PRINTTAB(X,Y-1)*" :IF Y=31 THEN Y=30
150 IF INKEY=(-58) THEN Y=Y-1:PRINTTAB(X,Y+1)*" :IF Y=-1 THEN Y=0
160 SOUND 1,-15,X,1
170 SOUND 1,-15,32-Y,1
180 UNTIL FALSE
```

Program 1

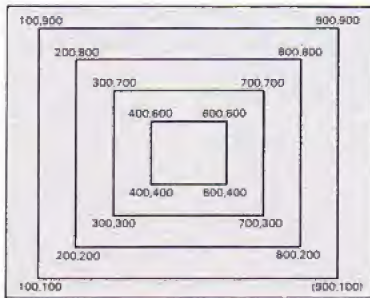


Figure 1: Window coordinates



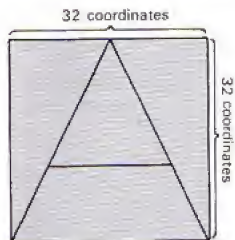


Figure IV: Mode 1 relationship between character and graphics coordinates

ground or else you wouldn't see them.

So if your alien is trying to move onto part of the screen that's not in the background colour then it has collided with something.

POINT simply allows you to check the next bit of screen. It's easy to use and almost foolproof.

There is one small problem with its use. If you look at Program I you'll see that we're happily displaying and erasing the alien using PRINT. This means that we're using the Mode 1 text screen, as shown in Figure II.

POINT, however, uses the

graphics screen, as shown in Figure III.

As you can see, they're completely different. The text screen uses the top left corner as 0,0 and is measured in character positions (40 by 32).

The graphics screen has the bottom left corner as 0,0 and has 1280 times 1024 coordinates. There has to be a little bit of maths to sort things out.

The main thing to remember is that whichever system of measurement is used, they both refer to the same thing, the screen. The 1280 horizontal units of the graphics screen correspond to the 40 characters across of the text screen.

Simple division tells you that each character is 32 graphics units across (1280/32). Similarly the fact that the 32 characters down of the Mode 1 screen correspond to 1024 graphics points means that each character has a depth of 32 graphics points (1024/32).

Knowing this, it's easy to work out the graphics coordinates referring to a particular character space. Remember that each character will occupy 1024 (32 times 32) graphics coordinates.

Figure IV shows the re-

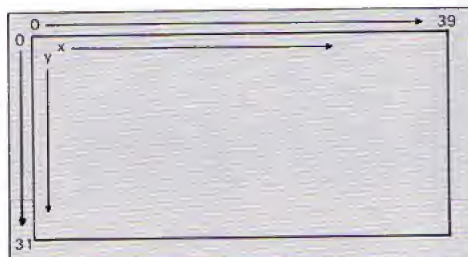


Figure II: Mode 1 text screen



Figure III: Mode 1 graphics screen



lationship between a Mode 1 text character and its graphics coordinates.

Have a look at Program III, which mixes both types of coordinates. It draws two lines which pinpoint the coordinates of the top left hand of the space printed by line 60.

From this you should be able to see that the graphics coordinates of the top left hand corner of a character printed at TAB (x,y) are (x\*32), (1023-y\*32).

However, we don't always want to look at the top left corner of a character. It's usually better to look at its middle.

This is because some of the

characters we're checking up on may be odd shapes where the corners aren't used and are still in the background colour.

Figure V shows this. If we just POINTed at the top left corner we'd get 0 returned as it is still black. We'd miss the yellow character altogether.

To find the middle of the character we add 16 to the x coordinate and take 16 from the y coordinate. Our formula now becomes (x\*32+16), (1007-y\*32). Program IV shows the suitably adjusted lines going through the centre of the space.

So now we not only know how to look for a particular

```

10 REM PROGRAM III
20 MODE 1
30 MOVE 0,863:DRAW 1279,
863
40 MOVE 96,0:DRAW 96,102
3
50 COLOUR 130
60 PRINT TAB(3,5) CHR$(13
2)
70 REPEAT UNTIL FALSE
  
```

Program III

```

10 REM PROGRAM IV
20 MODE 1
30 MOVE 0,847:DRAW 1279,
847
40 MOVE 112,0:DRAW 112,1
823
50 COLOUR 130
60 PRINT TAB(3,5) CHR$(13
2)
70 REPEAT UNTIL FALSE
  
```

Program IV

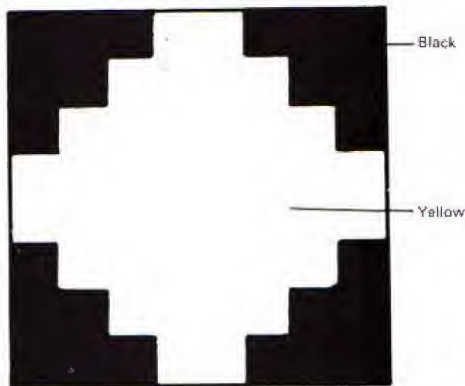


Figure V: Top left corner still background.

## From Page 19

colour on the screen, we can also convert text coordinates to graphics coordinates. This allows us to POINT at the right place.

Let's see it all in practice with Collision Detection.

This is the same old alien program with a few extras added. For a start there's PROCobstacle which uses the window technique of Program 11 to create a big yellow block.

PROCgame is practically the same as lines 100 to 170 of Program 1. What is different is that now line 270 checks the colour of the screen that the alien is about to move to.

It POINTs to the centre of the next space and puts the result in the variable check.

The next line prints the alien, but only on condition that check is not equal to 2. That is, it only prints it if the alien is moving onto a black background, not the yellow obstacle.

If check is 2 then the alien

isn't printed and the REPEAT...UNTIL loop of lines 140 and 160 ends. The program then comes to PROCbang, performs it, encounters an endless loop and goes no further.

And that's all there is to collision detection. It's not hard once you've decided on what logical colours to use and where you're looking.

As you can see, the last program is much more a game than Program 1. Why not improve it even further?

Obviously PROCobstacle could be changed to provide more yellow blocks. And they could appear or disappear with time.

And why not have some red objects which the alien has to collect? These would be logical colour 1 so you could have a line like:

```
IF check=1 THEN
  score=score+1
```

There's lots you can do, and it's not that hard. All it needs is someone to POINT it out.

```
10 REM COLLISION DETECTI
ON
20 REM BY NIGEL PETERS
30 REM BASED ON A PROGRA
M BY IAN RODGERS
40 REM use cursor keys
50 MODE1
60 VDU23,1,0;0;0;0;
70 VDU23,224,24,60,126,2
19,126,36,66,129
80 X=0
90 Y=0
100 PROCobstacle
110 COLOUR 128
120 REPEAT
130 PROCgame
140 UNTIL check=2
150 PROCbang
160 REPEAT UNTIL FALSE
170 DEFPROCbang
180 CLS
190 SOUND 0,-15,6,40
200 PRINT TAB(20,15)*BANG
210 ENDPROC
220 DEFPROCobstacle
230 VDU 24,416;800;600;99
2;
240 SCOL 0,130:CLG
250 ENDPROC
260 DEFPROCgame
270 check=POINT((X*32+16)
,(1023-Y*32-16))
280 IF check<>2 THEN PRIN
TTAB(X,Y)CHR$224
290 FOR delay=1 TO 100:NE
XT
300 IF INKEY(-122) THEN X
=X+1:PRINTTAB(X-1,Y)*" "IF
X=39 THEN X=38
310 IF INKEY(-26) THEN X=
X-1:PRINTTAB(X+1,Y)*" ":IF X
=-1 THEN X=0
320 IF INKEY(-42) THEN Y=
Y+1:PRINTTAB(X,Y-1)*" ":IF Y
=31 THEN Y=30
330 IF INKEY(-58) THEN Y=
Y-1:PRINTTAB(X,Y+1)*" ":IF Y
=-1 THEN Y=0
340 SOUND 1,-15,X,1
350 SOUND 1,-15,32-Y,1
360 ENDPROC
```

Collision detection program

ELECTRON, BBC Model B  
(any OS, BASIC 1/11)

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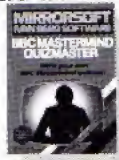
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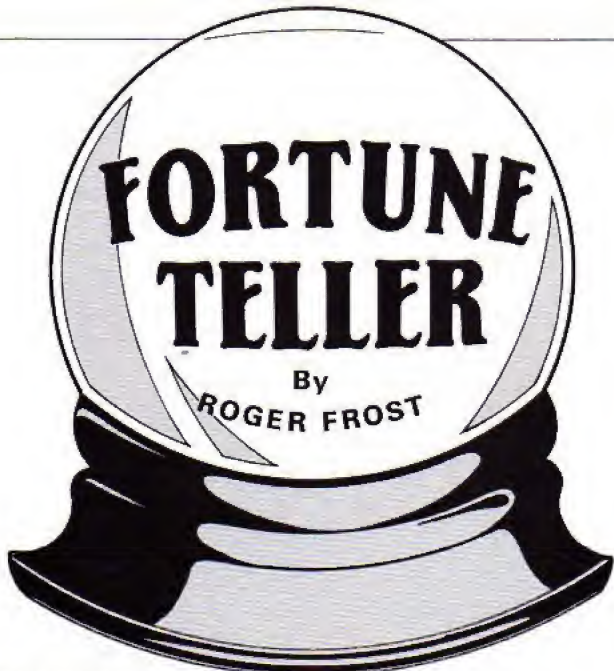
THIS program is a sure-fire money spinner for fêtes and shows, or it could add to the fun at a party.

If you have a printer, the customers can be given a hard copy of their fortune.

Fortune Teller produces a set of sentences concerning a person's future. They are, in fact, completely random and a disclaimer appears on the printout to avoid upsetting the astrologers and the faint-hearted among your clientele.

The program asks for your name, sex and date of birth. It will tell you the day on which you were born, with a relevant line from the "Monday's child is fair of face" ditty and also your star sign.

You are then given seven sentences of fortune on topics ranging from work and money to love, travel and leisure. There are 20 million possible combinations.



## PROCEDURES

### PROCinit PROCcenter

Dimensions arrays and reads in some data. Requests various bits of information about the client.

### PROCday

Works out the day of the week on which the person was born.

### PROCsign

Works out the person's zodiac sign.

### PROCfortune

Reads in all the fortune data. As the program is less than 6k there is scope here for much extension. The data for fortunes is stored in various categories. Variable names will give some idea of what they are about.

### PROCdisplay

Clears the input screen and displays the fortune. The love fortune depends on the sex of the person and is chosen out of 20 possibilities. The other fortunes are chosen out of 10 variables.

Line 190 checks for mistakes in entering dates of birth. If you want to use the program with people over 100 years or babies born after 1985, you will need to alter the value of Y%.

When you are ready to leave one fortune and start the next you have to press the space bar. This instruction is not on the screen to keep the display uncluttered for the client, but the operator will

need to know it.

The addition of a hard copy adds interest for the customers. Three more short lines are needed for this:

```
375 VDU 2
515 VDU 3
535 REM *FX call to set up
p printer.
```

Go seek your fortune, and may the stars shine favourably upon you.

```
10 REM Fortune Teller
20 REM by Rog Frost
30 REM (C) ELECTRON USER
40 MODE6
50 VDU19,0,4,0,0,0
60 PRINTTAB(13,3)"FORTUNE
  TELLER"TAB(13,4)
*****:FOR delayZ=0TO1000:
NEXT
70 error$="I think you h
ave made a mistake.
Try again"
80 PROCinit
90 PROCcenter
100 PROCday
110 PROCsign
120 PROCfortune
```

```
130 PROCdisplay
140 REPEATUNTILGET=32:CLE
AR:RUN
150 DEFPROCcenter
160 PRINTTAB(0,6)"Please
enter and then press the R
ETURN key:"
170 *FX15,0
180 INPUT "The year of yo
ur birth (4 figures) e.g. 1
977 ",Y%
190 IF Y%<1884 OR Y%>1985
PRINT "error$:FOR up=1TO5:V
DU11:NEXT:FOR delay=0TO3000
:NEXT:PRINT SPC(255):FORup=
1TO8:VDU11:NEXT:GOTO170
200 *FX15,0
```

```
210 INPUT "The month of y
our birth as a number, E
.g. April is 4 ",M%
220 IF M%<1 OR M%>12 PRIN
T "error$:FOR up=1TO5:VDU11:
NEXT:FOR delay=0TO3000:NEXT
:PRINT SPC(255):FORup=1TO8:
VDU11:NEXT:GOTO200
230 *FX15,0
240 INPUT "The date of yo
ur birth as a number, E
.g. 14 ",D%
250 IF D%<1 OR (M%=2 AND
D%>29) OR (M%=(4 OR 6 OR 9
OR 11) AND D%>30) OR D%>31
PRINT "error$:FOR up=1TO5:
VDU11:NEXT:FOR delay=0TO300
```

```
0:NEXT:PRINT SPC(255):FORup=
1TO8:VDU11:NEXT:GOTO230
260 *FX15,0
270 INPUT "Your sex ",n
ame$
280 *FX15,0
290 INPUT "Your sex (M/F)
",sex$
300 IF sex$="M" OR sex$="
F" THEN 310 ELSE GOTO290
310 ENDPROC
320 DEFPROCday
330 IF M%<2 THEN M%=M%+1
2:Y%=Y%-1
340 M%=D%+2*M%+INT(.6*(M%
+1))*Y%+INT(Y%/4)-INT(Y%/10
0)+INT(Y%/400)+2
```



```

350 NX=INT((NX/7-INT(NX/7
)))*7+.5)
360 IF NX>6 THEN NX=NX-7
370 IF NX<12 THEN NX=NX+12
2:YX=YZ+1
380 ENDPROC
390 DEFPROCdisplay
400 VDU23,1,0;0;0;0;
410 CLS
420 PRINT "Name: ";name$;
      SEX: ";sex$
430 PRINT "Date of birth:
";DX:"/";MX:"/";YX
440 PRINT "Day of birth:
";DAY$(NX) "MESSAGE$(NX)
450 IF DAY$(NX)="Sunday"
VDU11
460 PRINT "Star sign: ";s
ign$
470 IF sex$="M" THEN RX=1
0 ELSE RX=0
480 PRINT "LOVES(RND(10)+R
1)
490 PRINT "LIFE$(RND(10))
500 PRINT "TRAVELS(RND(10)
)
510 PRINT "MONEY$(RND(10))
520 PRINT "HAPPY$(RND(10))
530 PRINT "WORK$(RND(10))
540 PRINT "LEISURE$(RND(10)
))
550 VDU21:PRINT "Please do
not take this too seriousl
y.";VDU6
560 ENDPROC
570 DEFPROCinit
580 *FX11,0
590 DIM DAYS(6),MESSAGE$(
6),LOVE$(20),TRAVEL$(10),MO
NEY$(10),WORK$(10),LIFE$(10
),HAPPY$(10),LEISURE$(10)
600 FOR NX=0 TO 6
610 READ DAY$(NX)
620 NEXT
630 FOR NX=0 TO 6:READ MESS
AGE$(NX):NEXT
640 ENDPROC
650 DATA Saturday,Sunday,
Monday,Tuesday,Wednesday,Th
ursday,Friday
660 DATA Saturday's child
works hard for a living,The
child that is born on the
Sabbath day is bonny and
blithe and good and gay,Mon
day's child is fair of face
,Tuesday's child is full of
grace
670 DATA Wednesday's child

```

is full of woe,Thursdays'
child has far to go,Fridays'
child is loving and givin
g

```

680 DEFPROCsign
690 IF MX=12 AND DX=22 OR
MX=1 AND DX=21 sign$="CAPR
ICORN"
700 IF MX=1 AND DX=20 OR
MX=2 AND DX=20 sign$="AQUAR
IUS"
710 IF MX=2 AND DX=19 OR
MX=3 AND DX=21 sign$="PISCE
S"
720 IF MX=3 AND DX=20 OR
MX=4 AND DX=21 sign$="ARIES
"
730 IF MX=4 AND DX=20 OR
MX=5 AND DX=21 sign$="TAURU
S"
740 IF MX=5 AND DX=20 OR
MX=6 AND DX=21 sign$="GEMIN
I"
750 IF MX=6 AND DX=20 OR
MX=7 AND DX=21 sign$="CANCE
R"
760 IF MX=7 AND DX=20 OR
MX=8 AND DX=21 sign$="LEO"
770 IF MX=8 AND DX=20 OR
MX=9 AND DX=23 sign$="VIRGO"
780 IF MX=9 AND DX=22 OR
MX=10 AND DX=23 sign$="LIBR
A"
790 IF MX=10 AND DX=22 OR
MX=11 AND DX=23 sign$="SCO
RPID"
800 IF MX=11 AND DX=22 OR
MX=12 AND DX=23 sign$="SAGI
TTARIUS"
810 ENDPROC
820 DEFPROCfortune
830 FOR AX=1 TO 10:READTRAV
EL$(AX):NEXT
840 DATAYou are the stay
at home type.,Your travels
will be of a local nature.,
The world will be your oyst
er.,The sky will be your li
mit.,Your journeys could be
into space.,You will explo
re your home area.
850 DATAYou could travel
to other continents.,You m
ay travel far by sea.,There
may be unusual journeys for
you.,Beware of travels. Th
ey hold danger.
860 FOR AX=1 TO 10:READMONE
Y$(AX):NEXT

```

870 DATAYou may become ve
ry rich.,Money will always
cause you worries.,You will
have no cares regarding mo
ney.,You can expect lucky a
oney to come.,You will be p
oor but honest.,Money suppl
ies could be a problem.

880 DATAYou will have a n
eed for much money.,You wil
l have to work hard for mon
ey.,Do not expect to be ric
h.,You may inherit a fortun
e.

890 FORAX=1 TO 10:READ HAP
PY\$(AX):NEXT

900 DATAYour life will be
very happy.,Life may be a
struggle for you.,You will
face many problems in life.
.,You will lead a glorious l
ife.,You will overcome life
's problems.,You will lead
a cheerful life.

910 DATAYour life could b
e a bit of a misery.,You wi
ll enjoy life to the full.,
Life could be very good to
you.,You should enjoy life
to the full.

920 FOR AX=1 TO 10:READWOR
K\$(AX):NEXT

930 DATAYou should enjoy
your work.,You will find yo
ur job a problem.,Work wil
l cause you no worries.,Any
job you get will prove tax
ing.,You should enjoy workin
g life.,Your work will brin
g you satisfaction.

940 DATASeek jobs for hap
piness not for money.,Do no
t let work rule your life.,
Workmates could be good fri
ends.,Work hard! Make money
! Enjoy life.

950 FORAX=1 TO 10:READLOVE
\$(AX):NEXT

960 DATAYour winning smil
e can charm the men.,Bewar
e of a tall dark stranger.,
A holiday romance may com
e your way.,Consider the char
m of a local lad.,Somewhere
somebody loves you.,Love i
s a many splendour'd thing.

970 DATAYou are a man of
men.,They can hurt.,Choose your
men friends with care.,You ca

uld get on well with a Leo
man.,A Libra man would suit
you well.

980 DATAYou are the charms
of a pretty blonde.,You ma
y meet a pretty girl this s
ummer.,Your love may end up
like her mother.,A homely
lass is the one for you.,Ar
ies girls will treat you ri
ght.

990 DATAYou are a Scorpio
lass. They are good fun.,Be st
eady with the girl you love
.,Don't rush. Miss Right ex
ists.,The girls all love yo
u.,Lucky fellow!,A happy m
arriage will be yours.

1000 FORAX=1 TO 10:READLIFE
\$(AX):NEXT

1010 DATAYour life should
be long and happy.,With car
e expect a long life.,Take
care of yourself; you have
value.,You should be active
for years to come.,Your he
alth may cause minor proble
ms.

1020 DATAKeep active to en
joy a long life.,Life may b
e long if you keep off fags
.,You should keep fairly he
althy.,A healthy body will
mean a long life.,You shoul
d reach a ripe old age.

1030 FORAX=1 TO 10:READLEIS
URE\$(AX):NEXT

1040 DATAYou will find it
easy to make friends.,Avoid
physical activities.,Your
hobby could make you famous
.,Sporting activities could
provide fun.,Look out for
an unexpected talent.,Your
hobby could earn you such a
money.

1050 DATAA new hobby may b
ring romance.,A pastime may
land you on the rocks.,Wid
en your circle of friends.,
Certain hobbies could be a
danger.

1060 ENDPROC

This listing is included in
this month's cassette
tape offer. See order
form on Page 61.



## Will you be the first Earthling to win a pla

Acornsoft are issuing a nationwide challenge to all Acorn Electron and BBC Micro users.

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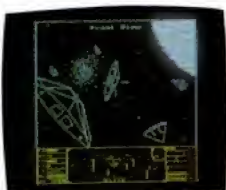
load your game onto cassette or disc each time you take a break from play.

When you reach the rank of "Competent" or higher, you should send us the secret code number revealed to you by your computer.

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You can also get a free Elite poster by ringing 0933 79300.

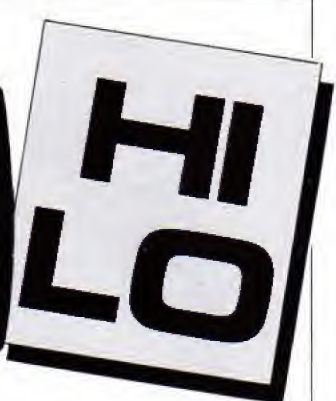


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**SIMPLE** but fun, **Hilo** by **ANDREW LORD** has the **Electron** testing your powers of mental arithmetic.

The micro "thinks" of a number and you have to try and guess what it is. After each guess, if you're wrong, you're told if the number you picked was higher or lower than the correct one.

Using this information you can then guess again. The process continues until you arrive at the right answer.



```

10 REM HILO
20 REM ANDREW LORD
30 REM (C) ELECTRON USER
40 DIM A$(10),A$(12),A$(
10),T$(100):FOR X=1 TO 10:2
$(X)="LORD---SOFT":NEXT X:CLS:VDU21,1,0;0;0
50 PRINT"HELLO MY NAME IS FRANK,WHAT'S YOURS:INPUT A$(1):CLS:PRINT"WELL HELLO THERE "A$(1)" DO YOU WANT TO PLAY A GUESSING GAME Y/N":INPUT B$:IF B$="Y" THEN GOTO 60 ELSE GOTO 120
60MODE:VDU23,1,0;0;0;0:PRINT"IF YOU HAVE SUCH A BAD MEMORY THAT YOU CAN'T REMEMBER WHAT NUMBERS YOU HAVE USED,THEN,I WILL GIVE YOU SOME ASSISTANCE.PRESS 'H' WHEN EITHER,"PRINT"" TOO LOW"
70PRINT" or",PRINT" TO O HIGH":PRINT"ARE BEING DISPLAYED AND THE NUMBERS THAT YOU HAVE CHOSEN SO FAR WILL BE PRINTED ALONG WITH WHETHER THEY WERE TOO LOW OR TOO HIGH,"TIME=0:REPEAT UNTILTIME=1500:GOTO220
80 VDU23,1,0;0;0;0:CLS:A$=INKEY$:IF A$="H" THEN GOSUB 350
90 CLS:PRINT TAB(5,3)"CHOOSE ANOTHER NUMBER:CLS=C$+1:INPUT A(C$)
100 C$=C$+1:IF A(C$) < N THEN GOTO 110 ELSE IF A(C$) > N THEN GOTO 120 ELSE IF A(C$) = N THEN 140 ELSE STOP
110 COLOUR 3:PRINT TAB(10,13)"TOO LOW":PRINT TAB(10,13)A$(C$):SOUND 1,-15,0,7:T$(C$)="was TOO LOW":GOTOB
120 COLOUR 3:PRINT TAB(10,13)"TOO HIGH":COLOUR 1:GOTO 1,-15,15,7;SOUND 1,-15,140,7:T$(C$)="was TOO HIGH":GOTOB
130 CLS:VDU 23,1,0;0;0;0:PRINTTAB(0,0)" ",TAB(4,10)"GOODBYE THEN "A$(1):" HOPE "TAB(4,12)"TO TALK TO YOU AGAIN":REPEAT UNTIL GET$=" "
140 SOUND 1,2,100,100:ENVLOPE 2,1,4,-4,4,10,20,10,0,0,2,0,0,0,0:IF C$=10 THEN GO TO 140 ELSE GOTO 320
150 C1=0:C1=C+C+6:INPUTTAB(1,1):T$(1)=T$(C1):T$(1)=T$(1)ENIT4)25THEN150ELSEPRINTTAB(4,30)SP(2):PRINTTAB(7,30)"PRESS SPACE TO CONTINUE":REPEAT UNTILGET$=" ":CLS:CLS:GOTO 0 220
160 COLOUR 1:COLOUR 130:CLS:PRINT TAB(4,0)"Congratulations you've guessed",TAB(4,10)"that the no. was "N;" in "C:" goes",TAB(4,14)"Your name can now be entered into",TAB(4,16)"the Electron User's Honours Table "
170TIME=0:REPEATUNTILTIME=1800
180MODE 1:COLOUR 2:COLOUR 129:CLS
190 PRINT TAB(12,0)"Electron User's",TAB(11,3)"-----",TAB(13,4)"Honours Table",TAB(12,5)"-----"
200 R=0:FOR O=0 TO 26 STEP 2:R=R+1:IFR=10THEN3ELSE GOTO210
210PRINT TAB(6,0):R;"....":T$(R):NEXT O
220 MODE 1:COLOUR 1:COLOUR 130:CLS
230 PRINT TAB(9,4)"ENTER THE LEVEL THAT",TAB(9,5)"YOU WISH TO PLAY AT"
240 COLOUR 0:PRINT TAB(10,10)"LEVEL.....1",TAB(10,12)"LEVEL.....2",TAB(10,14)"LEVEL.....3",TAB(10,16)"LEVEL.....4",TAB(10,18)"VIEW INSTRUCTIONS.....5",TAB(10,20)"VIEW HONOURS TABLE.....6"
250PRINT TAB(13,23)"EXIT FROM PROGRAM.....7":COLOUR 1:PRINT TAB(8,26)"(ONLY TYPE IN NUMBER)"
260 ON ERROR GOTO 220
270 INPUT L%:COLOUR 1:COLOUR 129:CLS:ON L% GOTO 280,290,300,310,320,370,130
280 N=RND(100):PRINT"";INPUT A NUMBER BETWEEN 1 AND 100:GOTO 340
290 N=RND(100):PRINT"";INPUT A NUMBER BETWEEN 1 AND 200:GOTO 340
300 N=RND(300):PRINT"";INPUT A NUMBER BETWEEN 1 AND 300:GOTO 340
310 N=RND(400):PRINT"";INPUT A NUMBER BETWEEN 1 AND 400:GOTO 340
320 COLOUR 1:COLOUR 130:CLS:PRINT TAB(4,4)"Congratul

```

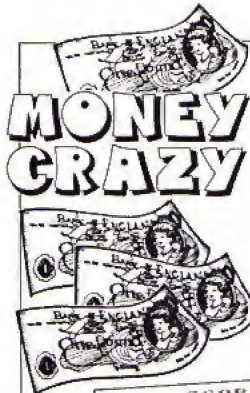
```

ations you've guessed",TAB(4,6)"that the no. was "N;" in "C:" goes",TAB(10,0)"BUT",TAB(9,10)"you need more practise",TAB(13,13)"on level 1":PRINTTAB(7,29)"PRESS SPACE TO CONTINUE"
330 REPEAT UNTIL GET$=" ":GOTO220
340 C=0:C$=1:INPUT A(C$):PRINT:GOTO230
350 CLS:VDU23,1,0;0;0;0:PRT"WHAT A TERRIBLE MEMORY YOU HAVE":PRINT"COLOUR 3:FOR F=1 TO C$:PRINT A$(F);":T$(F):NEXT:COLOUR 1:TIME=0:REPEAT UNTIL TIME=C$*200:RETURN
360PRINTTAB(5,0):R;"....":T$(R):PRINTTAB(6,30)"Please enter your name:GOTO 150
370COLOUR 2:COLOUR 129:CLS:PRINT TAB(12,0)"Electron User's",TAB(11,3)"-----",TAB(13,4)"Honours Table",TAB(12,5)"-----"
380 R=0:FOR O=0 TO 26 STEP 2:R=R+1:IFR=10THEN3ELSE GOTO390
390PRINT TAB(6,0):R;"....":T$(R):NEXT O
390PRINTTAB(5,0):R;"....":T$(R):PRINTTAB(4,30)"PRESS SPACE TO CONTINUE":REPEAT UNTILGET$=" ":GOTO220
400END

```

This listing is included in this month's cassette tape offer. See order form on Page 61.



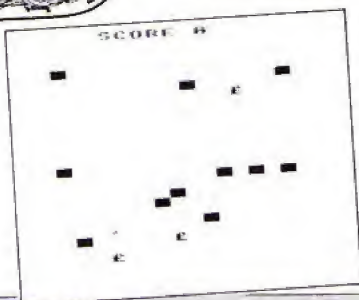


**FEELING** short of money? Well have a go at **ANDREW LOGAN's Moneycrazy**.

You are in control of a man who runs around the screen trying to collect pound notes that are scattered about.

However, like life, nothing is ever that simple and in his rush to get rich quick the little man has to avoid blocks that start appearing all over the place.

It's not easy, but it is fun.



## PROCEDURES

- PROCtitle** Displays title and instructions
- PROCinit** Sets up the arrays and picks the first position and the direction of the man.
- PROCmove** Checks the keys to see if a change of direction is desired and prints the man in his new position.
- PROCobstacles** Prints either a block or a pounds sign. If RND(1) is less than 0.22 a pound sign appears otherwise it's a block.
- PROCcheck** Sees whether you have hit a block or collected some money.
- PROCnewgame** Asks if you want another game.
- PROCscore** Displays the score.
- PROCdead** Happens when you hit a block!
- PROCdel (D%)** A delay procedure. The program is delayed for the parameter D%.

```

10REM **MONEYCRAZY**
20REM BY ANDREW LOGAN
30REM (C) ELECTRON USER
40MODE2
50ON ERROR GOTO 790
60PROCtitle
70PROCinit
80REPEAT
90PROCobstacles
100PROCmove
110PROCcheck
120PROCscore
130UNTIL DEAD
140PROCdel(100)
150PROCnewgame
160MODE:END
170DEF PROCtitle
180CLS:COLOUR123:COLOUR1:
CLS
190VDU23,1,0,0,0,0;
200PRINT "TAB(4); "MONEYCR
ASY"
210PRINT TAB(4); "*****
**"
220COLOUR7:PRINT "YOU MUS
T COLLECT THE "MONEY BUT A
VOID THE""YELLOW OBSTACLE
S""AND THE SIDES.WATCH""
"OUT FOR THE MONEY""WHICH
CHANGES INTO""BLOCKS.GOO
D LUCK!"
230PRINT "TAB(3);MOVE USI
NG:-LEFT""""LEFT""""Y"
...RIGHT""""UP""""
240...DOWN""PRESS SPACE T
O BEGIN"
250REPEAT UNTIL GET#=" "
250ENDPROC
260DEF PROCinit
270DIM OB(20,29)
280VDU23,1,0,0,0,0;
290DEAD:=FALSE
295VDU23,230,255,255,255,
255,255,255,255,255
300VDU23,231,16,56,16,124
,186,166,40,108
320X:=RND(14)+3:Y:=RND(12)
1+6:SCY:=X+Y:RND(4)
330COLOUR 123:CLS
340COLOUR12:FOR V1=4 TO 2
9:PRINT TAB(0,V1);CHR(230);T
AB(19,V1);CHR(230);NEXT
350FOR OX=0 TO 19:PRINT T
AB(OX,4);CHR(230);TAB(OX,30)
:CHR(230);NEXT
360COLOUR1:PRINT TAB(X,Y
);CHR(231)
370PROCdel(100)
380ENDPROC
390DEF PROCmove
400SOUND1,-15,20,1
410X:=X+M:=Y
420IF INKEY=98 IZ=1:GOTO4
70
430IF INKEY=67 IZ=2:GOTO4
70
440IF INKEY=73 IZ=3:GOTO4
70
450IF INKEY=105 IZ=4:GOTO
470
460PROCdel(10)
470IF IZ=1 X=X-1 ELSE I
F IZ=2 X=X+1 ELSE IF IZ=3
Y=Y-1 ELSE IF IZ=4 Y=Y+1
480IF X<0 THEN PROCdead
490IF Y<0 THEN PROCdead
500IF X=1 THEN PROCdead
510IF Y=4 THEN PROCdead
520PRINT TAB(X,M);SPC1
530COLOUR1:PRINT TAB(X,Y
);CHR(231)
540ENDPROC
550DEF PROCobstacles
560IF RND(1)<.22 THEN 590
570P:=1+RND(16):OZ=4+RND(
20):IF (P<X+1 AND P<X+1
-1 AND OZ<Y+1 AND OZ<Y+1
-1)THEN 570
580OB(P,OZ)=1:COLOUR7:
PRINT TAB(P,OZ);CHR(230);EN
DPROC
590X=X+1+AND(16):LZ=4+RND(
23):IF (LZ=X+1 AND LZ=Y+1)THEN
590
600OB(X,LZ)=3:COLOUR6:P
RINT TAB(X,LZ);""
610ENDPROC
620DEF PROCcheck
630IF OB(X,Y)=0 THEN
ENDPROC
640IF OB(X,Y)=1 THEN
PROCdead:ENDPROC
650IF OB(X,Y)=3 THEN V
DU2:SCY=SCY+50:OB(X,Y)=0
:ENDPROC
660ENDPROC
670DEF PROCnewgame
680CLS:PROCscore
690PRINT "*****TAB(4); "A
NOTHER(Y/N)"
700FX15,1
710G:=GET#
720IF G="Y" THEN CLEAR:6
7070 ELSE IF G="N" THEN E
NDPROC ELSE 710
730ENDPROC
740DEF PROCscore
750COLOUR2:PRINT TAB(5,1)
: "SCORE "+SCY
760ENDPROC
770DEF PROCdead:COLOUR9:P
RINT TAB(X,Y);CHR(231);SOU
ND,-15,30,20:DEAD:=TRUE:END
PROC
780DEF PROCdel(10):TIME=T
:REPEAT UNTIL TIME>T+DN:E
NDPROC
790MODE6:IF ERR#>17 THEN
REPORT:PRINT" at line "ERL
800END

```

*This listing is included in this month's cassette tape offer. See order form on Page 61.*



# National Micro

## Electron price DOWN £70!

– and lots more cuts that make  
Electron computing the biggest  
bargain there's ever been!

Never before has there been such an opportunity to move into serious computing at such a low, low price. With your new Electron you'll find all you need to get you started – an introductory cassette of 15 programs, a fully-detailed User Guide, an easy-to-understand book on programming – **PLUS** a free dust cover that comes with the compliments of National Micro Centres

**£129**

*Carriage £7*

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EX43 + I/F	<b>£394.25</b>	<b>£383.00</b>

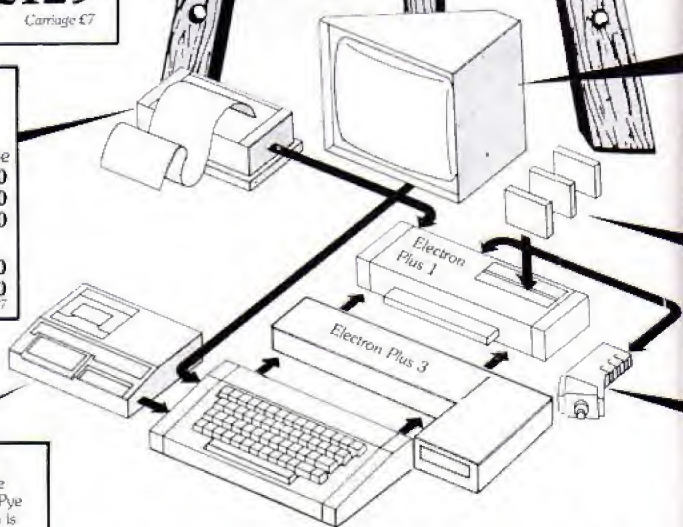
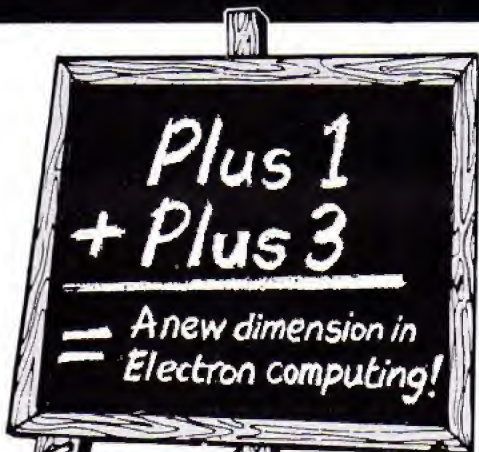
*Carriage £7*

## DATA RECORDER

From a wide selection of cassette recorders we recommend the Pye Data Cassette Recorder, which is a perfect match for the Electron. With it comes a FREE power pack and Electron lead.

**£38.00**

*Carriage £1*



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# Centres

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on

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You can also order via Prestel, Mailbox number 614298080

● At last the Electron comes into its own with the release of the PLUS 3 disc expansion unit. It provides up to 300k of fast, reliable and easy-to-use disc storage space. And it finally takes the Electron into the world of serious computing with a disc filing system that is twice as powerful as that of the BBC Micro.

The L-shaped PLUS 3 consists of the powerful Acorn Advanced Disc Filing System ADFS and one 3.5 inch drive. It attaches easily and quickly onto the Electron's expansion bus.

It comes complete with a comprehensive manual and utilities disc. So Electron users can be using the power of the PLUS 3 disc system within minutes of fitting it.

● The capabilities of the Electron can also be increased by the PLUS 1 interface. This can be attached to the expansion bus on the back of the Electron or it can be coupled directly to the PLUS 3. The PLUS 1 allows the use of electronics printers, ROM cartridges and analogue joysticks.

By themselves both the PLUS 1 and the PLUS 3 expand the versatility of the Electron enormously. Together they make the Electron unbeatable!

**The Electron PLUS 1 and PLUS 3**  
- the unbeatable combination for  
much more computing power!

**PLUS 1 PLUS 3**  
**£56.90 £229**

### Selling well... First Byte's switched joystick interface

Since it was launched at the Electron & BBC Micro User Show the switched joystick interface from First Byte has been one of our top sellers. This plug-in cartridge takes standard Atari-style joysticks which are much more popular - and cheaper - than

Now only  
**£19.95**  
Carriage £1



These will  
take Kempton  
& Sureshot joysticks.

### MONITORS

You can happily operate your Electron with your domestic TV set. But more and more users are finding that for a really crisp picture you need a special monitor. We offer two monochrome and three colour monitors.

Zenith 12" (green screen) ..... **£81.00**  
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### The Monitor you've been waiting for

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Sureshot (self-centering action) .. **£15.67**

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Item	Please supply the following:	Qty	Total	
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**Attractive credit terms**  
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Please allow up to 28 days for delivery

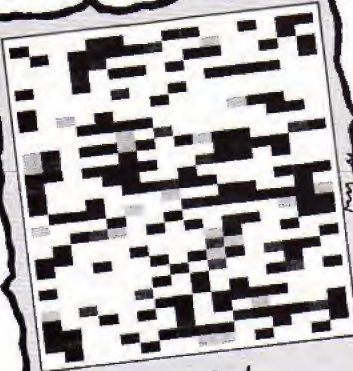
# SCRAPBOOK

SCRAPBOOK is the feature that contains a selection of all the short, simple programs sent in by our readers.

It's where we keep a record – our scrapbook – of all the interesting little routines that don't end up in the Notebook or in Program Probe but are too good for us not to share.

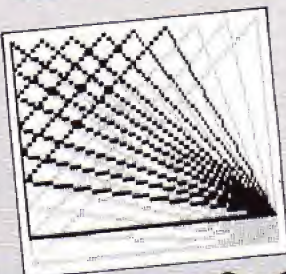
This month it's very much a graphics show. Next month – who knows? It's up to you.

So if you enjoy messing about with your Electron and want to share your discoveries with other Electron users, send them in to us.



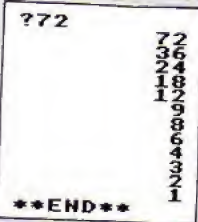
*A colourful collection from Nicholas Gale*

```
10 REM DOTTY
20 REM NICHOLAS GALE
30 REM ENFIELD
40 MODE 2
50 VDU 23,1,0;0;0;0;
60 A=RND(16)
70 B=RND(30)
80 COLOUR RND(144)
90 PRINT TAB(A,B);
100 GOTO 60
```



*Fun fractionals from M. Sumner*

```
10 REM *Factors*
20 REM M.Sumner
30 REM Herne Bay
40 INPUT A:B=A
50 IF A MOD B=B THEN PRI
NT B
60 B=B-1:IF B=B THEN GOT
0 B
70 GOTO 50
80 PRINT "**END**":GOTO
10
```



*More graphics action from Nicholas Gale*

```
10 REM SQUARE
20 REM NICHOLAS GALE
30 REM ENFIELD
40 MODE 2
50 VDU 23,1,0;0;0;0;
60 REPEAT
70 FORA=300 TO 700 STEP
50
80 BCOLR,RND(6)
90 MOVE A,300
100 DRAW A,700
110 FOR B=700 TO 300 STEP
-50
120 DRAW B,700
130 DRAW 700,B
140 DRAW A,300
150 NEXT B,A
160 UNTIL FALSE
```



## A star program from David Ballard



```

10 REM*STAR*
20 REM DAVID BALLARD
30 REM LEEK,STAFFS
40 B=1
50 MODE2
60 REPEAT
70 @COL@,B
80 FORA=@TO128@STEP15
90 MOVE@40,B
100 DRAWA,1@24
110 NEXT
120 FORA=@TO128@STEP15
130 MOVE@40,B
140 DRAWA,B
150 NEXT
160 FORA=@TO1@24STEP15
170 MOVE128,512
180 DRAWB,A
190 NEXT
200 FORA=@TO1@24STEP15
210 MOVE@,512
220 DRAW128@,A
230 NEXT
240 B=B+1
250 UNTILB=8
    
```

## How to get your name in lights – Nathan Walton

```

10 REM NAMES
20 REM BY NATHAN WALTON
30 REM LICHFIELD, STAFF
40 CLS
50 PRINT TAB(7,14)*"WHAT
IS YOUR NAME?"
60 INPUT NAME$
70 MODE 2
80 VDU 23,1,0;0;0;0;
90 REPEAT
100 PRINT TAB(RND(10),RN
D(27))NAME$
110 COLOUR RND(16)
120 UNTIL FALSE
    
```

```

NATHAN NATHAN
NATHAN NATHAN NATHAN
NATHAN NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
NATHAN NATHAN
    
```

Send your programs to  
Scrapbook, Electron  
User, 68 Chester Road,  
Hazel Grove, Stockport  
SK7 5NY.



# Super Archer

Use your Electron to get right on target

\* SUPER ARCHER \*  
by Ian W. Brown

The player selects each time the strength of the shot, the angle from the ground in degrees, and its horizontal deviation.

Press Space

\* SUPER ARCHER \*  
by Ian W. Brown

For example:  
Strength = 25  
Elevation = 8  
Deviation = -5  
The strength of shot (5-40) is 25, its elevation (0-90) is eight degrees, and the shot is aimed five degrees to the left (-30-30).  
Press Space

\* SUPER ARCHER \*  
by Ian W. Brown

The arrow is then automatically fired, and its path is shown from above and from the side.  
This is repeated for all three shots. If any hit the target, then the target is shown after all the arrows have been fired.

Press Space

```
10 REM "Super Archer"
20 REM
30 REM Written for the
40 REM ACORN ELECTRON
50 REM by
60 REM Ian W. Brown
70 REM
80 REM (C) ELECTRON USER
90 REM
100 :
110 MODE 1
120 PROCinit
130 PROCtitle
140 IF INSTR("Yy",key$) P
  PROCinstruct
150 PROCinput
160 FOR play=1 TO players
170 PROCwindsetup
180 FOR arrow=1 TO 3
190 MODE 5
200 PROCscreen
210 PROCfactors
220 REPEAT PROCarrow
```

```
230 UNTIL height<0 OR dis
  p>=dist
240 SOUND 17,0,0,0
250 IF FNxyz(idev,height)S
  DUND 0,-1,5,2
260 arrowheight(idev,arro
  w)=height:arrowdev(idev,ar
  ow)=dev
270 VDU 28,0,31,19,31:PRI
  NTAB(3)"Press any key":ike
  y=GET
280 NEXT arrow
290 PROCassess
300 IF NOT allowmiss PROCta
  rget
310 NEXT play
320 PROCcompare
330 IF INSTR("Yy",ans$) R
  UN
340 PRINT "Byee!!"
350 PROCausic
360 END
370 :
```

```
380 DEF PROCinit
390 ON ERROR MODE6:REPORT
:PRINT* at line %;ERL:END
400 ENVELOPE 1,2,2,-2,0,1
  ,1,0,0,0,0,0,0
410 VDU 23,223,255,255,25
  5,255,255,255,255,255
420 VDU 23,224,24,24,24,2
  4,255,126,60,24:REM down-a
  rrow
430 VDU 23,225,24,60,126,
  255,24,24,24,24:REM up-ar
  row
440 VDU 23,226,0,0,56,50,
  56,0,0,0:REM man (top-view
  )
450 VDU 23,227,58,57,17,2
  55,57,41,42,48:REM man (si
  de-view)
460 VDU 23,228,24,24,24,2
  4,24,24,24,24:REM target (
  top-view)
470 VDU 23,229,24,24,24,2
```

```
4,24,24,36,66:REM target (
  side-view)
480 VDU 23,230,129,66,36,
  24,24,36,66,129:REM cross
  490 DIM col1(10)
500 DIM arrowheight(4,3)
510 DIM arrowdev(4,3)
520 DIM score(4)
530 ENDPROC
540 :
550 DEF PROCwindsetup
560 f=1048/dist
570 IF wind windvel=RND(2
  0) ELSE windvel=-#
580 windang=RND(360)
590 ENDPROC
600 :
610 DEF PROCscreen
620 VDU 23,1,0;0;0;0:GCO
  L 0,1
630 MOVE 0,136:DRAW 1279,
  136:DRAW 1279,504:DRAW 0,50
  4:DRAW 0,136
```



EVER fancied yourself as a budding Robin Hood? Do you think using a longbow is easy?

Put yourself to the test with IAN BROWN's Super Archer, a game for one to four players.

You must try to hit a target with an arrow at four different ranges.

And if that isn't difficult enough the real tox-

ophilites among you have the choice of combatting side winds.

All the instructions are in the program and the controls are simplicity itself. However it may be easy to play but it's not easy to hit the target.

Super Archer is just like the real thing — but you don't have to keep retrieving the arrows.



```

640 MOVE 0,552: DRAW 1279,
552: DRAW 1279,952: DRAW 0,95
2: DRAW 0,552
650 COLOUR 2
660 PRINTTAB(2,1)"PLAYER"
TAB(12,1)"SHOT"
670 PRINTTAB(0,15)"SIDE"
CHR$224: TAB(14): CHR$225" PLA
N"
680 COLOUR 3
690 PRINTTAB(9,1): play: TA
B(17,1): arrow
700 COLOUR 1
710 PRINTTAB(13,26): dist:
"
720 COLOUR 2
730 VDU 31,1,0,226
740 VDU 31,1,23,227
750 COLOUR 1
760 VDU 31,18,8,228
770 VDU 31,18,23,229
780 ENDPROC
790 :

```

```

800 DEF PROCfactors
810 IF wind PROCwindinfo
820 REPEAT VDU 28,0,29,19
,28,12,7: COLOUR 2: PRINT"Str
ngth =" : COLOUR 3: INPUTTA
B(12): strength: UNTIL strengt
h>4 AND strength<41
830 REPEAT VDU 28,0,30,19
,29,12,7: COLOUR 2: PRINT"Ele
vation =" : COLOUR 3: INPUTTA
B(12): elev: UNTIL elev>1 AND
elev<61
840 REPEAT VDU 28,0,31,19
,30,12,7: COLOUR 2: PRINT"De
viation =" : COLOUR 3: INPUTTA
B(12): angle: UNTIL angle>31
AND angle<31
850 GCOL 0,3
860 velh=strength*COSRADE
lev
870 velv=strength*SINRADE
lev
880 height=1.5

```

```

890 disp=0
900 dev=0
910 time=0
920 SOUND 1,1,25,4
930 SOUND 1,-1,25,-1
940 ENDPROC
950 :
960 DEF PROCarrow
970 time=time+.85
980 disp=velh*time
990 height=1.5+velv*time-
5*time*time
1000 dev=dev+(windvel*SINR
ADwindang+velh*SINRADangl)
/100
1010 PLOT 69,128+*disp,75
2+dev*16
1020 PLOT 69,128+*disp,25
2+height*16
1030 ENDPROC
1040 :
1050 DEF PROCcompare
1060 VDU 19,0,4:

```

```

1070 VDU 26: CLS: PRINT""
1080 FOR play=1 TO players
1090 PRINT"Player ",play:
": Score ",score(play)
1100 NEXT play
1110 PRINT""Another game
(Y/N)? "
1120 REPEAT ans$=GET$
1130 UNTIL INSTR("YyNn",an
s$)
1140 ENDPROC
1150 :
1160 DEF PROCassess
1170 allmiss=TRUE
1180 FOR arrow=1 TO 3
1190 IF F$hit(play,arrow)
allmiss=FALSE
1200 NEXT arrow
1210 ENDPROC
1220 :

```

## VARIABLES

players	Number of players.
play	Current player.
arrow	Current arrow of current player.
dist	Distance from player to target: 25/50/75/100m.
windvel	Prevailing wind velocity in m/s.
windang	Prevailing wind direction in degrees.
strength	Strength of shot (relative)
elev	Elevation of shot from ground in degrees.
angle	Horizontal angle of shot in degrees.
velh	Horizontal velocity of arrow.
velv	Initial vertical velocity of arrow.
dev	Current deviation of arrow (in metres from straight line from player to target).
disp	Current distance of arrow from player.
height	Current height of arrow from ground.
time	Artificial time function.
x,y,z	Variables for calculation of accuracy of shot.
ra%,i%,j%,	Variables for plotting of circular target.
lim	Variable for calculation of score gained by arrow.
note	Current note being played in PROCmusic.
pitch	Pitch of note.
duration	Duration of note.

## ARRAYS

arrowheight(play,arrow)	Final height of particular arrow above ground.
arrowdev(play,arrow)	Final deviation of particular arrow.
col%(r%)	Colour of ring % of target.
score(play)	Score of particular player.

## FLAGS

allmiss	TRUE if all arrows of a particular player have missed target.
wind	TRUE if wind effects have been selected.

## Super Archer listing

### From Page 33

```

1230 DEF PROCtarget
1240 CLG:VDU 26
1250 VDU 19,0,4,0;
1260 VDU 29,640,512;
1270 RESTORE 1430
1280 FOR rX=1 TO 10
1290 READ colX(rX)
1300 IF colX(rX)<colX(rX-1)
1310 NEXT
1320 GCOL 4,0
1330 VDU 5
1340 FOR arrow=1 TO 3
1350 IF FNhit(play,arrow)
MOVE x=640-32,y=640+16:VDU
230:PROCscore(z)
1360 NEXT arrow
1370 VDU 4
1380 GCOL 0,3
1390 PRINT " Player ";play
;: Score ";score(play)
1400 PRINTTAB(3,30)"Press
any key";key=GET
1410 ENDPROC
1420 :
1430 DATA 2,2,3,3,3,0,0,1,
1,0
1440 :
1450 DEF PROCcircle(rX)
1460 raX=(11-rX)*32
1470 GCOL 0,colX(rX)
1480 FOR iZ=raX TO raX ST
EP 8
1490 jX=SQBRAS(raX*raX-iX*
iX)
1500 MOVE iX,-jX
1510 DRAW iX,jX
1520 NEXT
1530 ENDPROC
1540 :
1550 DEF PROCwindinfo
1560 GCOL 0,1
1570 MOVE 640,660
1580 PLOT 1,COSRAD(windang*
80,-SINRAD(windang*80)
1590 PLOT 1,-40*SINRAD(60-
windang),40*COSRAD(60-wind
ang)
1600 PLOT 0,40*SINRAD(60-w
indang),-40*COSRAD(60-wind
ang)
1610 PLOT 1,-40*COSRAD(wind
ang-30),40*SINRAD(windang-
30)
1620 COLOUR 1
1630 PRINTTAB(13,13)"W/V "
;windvel
1640 ENDPROC
1650 :
1660 DEF FNhit(play,arrow)
1670 x=arrowdev(play,arrow)
1680 y=arrowheight(play,ar
row)-1.5
1690 z=SGR(x*x+y*y)
1700 IF z<=.5 =TRUE ELSE =
FALSE
1710 :
1720 DEF FNxyz(dev,height)
1730 x=dev
1740 y=height-1.5
1750 z=SGR(x*x+y*y)
1760 IF z<=.5 =TRUE ELSE =
FALSE
1770 :
1780 DEF PROCscore(z)
1790 li=0
1800 REPEAT li=li+.05
1810 UNTIL li=.5 OR z<=li
1820 IF z<=li score(play)
=score(play)+1-INT(li*20)
1830 ENDPROC
1840 :
1850 DEF PROCtitle
1860 VDU 23,1,0,0;0;0;COL
OUR 1
1870 PRINTTAB(0,1)STRING(
40,CHR$223)
1880 FOR yyZ=2 TO 29
1890 VDU 31,0,yyZ,223,31,3
9,yyZ,223
1900 NEXT yyZ
1910 PRINTTAB(0,30)STRING
(40,CHR$223);
1920 COLOUR 3
1930 PRINTTAB(14,4)"SUPER
ARCHER"
1940 COLOUR 2
1950 PRINTTAB(14,5)"*****
*****"
1960 VDU 31,12,4,227,31,27
,4,227
1970 COLOUR 1
1980 PRINTTAB(12,7)"by Ia
n M. Brown"
1990 VDU 28,3,27,36,18
2000 PROCmusic
2010 COLOUR 2
2020 PRINT "Instructions
(Y/N)? ";
2030 REPEAT key$=GET$:UNTIL
INSTR("YyNn",key$)=PRINT
key$
2040 ENDPROC
2050 :
2060 DEF PROCinput
2070 PRINT "How many play
ers (1-4)? ";
2080 REPEAT key$=GET$:UNTIL
INSTR("1234",key$)
2090 PRINT key$:players=VAL
(key$)
2100 PRINT "Crosswind eff
ects? ";
2110 REPEAT key$=GET$:UNTIL
INSTR("YyNn",key$)
2120 PRINT key$:IF INSTR("
Yy",key$) wind=TRUE ELSE wi
nd=FALSE
2130 REPEAT VDU 28,2,22,37
,21,12
2140 INPUT "Enter distance
(25/50/75/100m): "dist
2150 UNTIL dist=25 OR dist
=50 OR dist=75 OR dist=100
2160 ENDPROC
2170 :
2180 DEF PROCinstruct
2190 CLS
2200 PRINT " This game
simulates (rather "loos
ely) a game of archery
for "one to four player
s."
2210 PRINT " Each play
er takes turn to fire "thre
e arrows at a target f
rom "between 25 and 100 me
tres away."
2220 PROCcontinue
2230 PRINT " The play
er selects each time "the
strength of the shot,
the "angle from the grou
nd in degrees."
2240 PRINT "and its horizon
tal deviation."
2250 PROCcontinue
2260 PRINT "For example: "
Strength = 25 " " Elev
ation = B " " Deviation =
-5 "
2270 PRINT "means strengt
h of shot (5*40) is "25,
its elevation (0*60) is ei
ght "degrees, and the sh
ot is aimed "five degree
s to the left (-30*30)."
2280 PROCcontinue
2290 PRINT " The arrow i
s then automatically "fire
d, and its path is shown f
rom "above and from the si
de."
2300 PRINT " This is rep
eated for all three "shot
s. If any hit the target, t
hen "the target is shown
after all the "arrows have
been fired."
2310 PROCcontinue
2320 PRINT " The winni
ng shots are shown as "cros
ses on the target. The poi
nts "scored are then calcul
ated."
2330 PRINT " The whole
process is repeated "for
all the players, and fina
lly "the scores printed at
the end."
2340 PROCcontinue
2350 PRINT " If crosswin
ds are selected at "the
beginning of the game, t
he "random wind speed an
d direction "are display
ed in the top half of "th
e screen."
2360 PRINT " These stay
constant throughout "one
player's turn, but will cha
nge "for the next player."
2370 PROCcontinue
2380 ENDPROC
2390 :
2400 DEF PROCcontinue
2410 COLOUR 1
2420 PRINTTAB(11,17)"Press
Space"
2430 REPEAT UNTIL GET=32
2440 CLS
2450 COLOUR 2
2460 ENDPROC
2470 :
2480 DEF PROCmusic
2490 RESTORE 2570
2500 FOR note=1 TO 11
2510 READ pitch,duration
2520 SOUND 1,-1,pitch,dura
tion
2530 SOUND 1,0,0,0
2540 NEXT note
2550 ENDPROC
2560 :
2570 DATA 100,4,100,4,100,
8,100,4,100,4,100,8,100,4,1
00,4,100,6,92,2,84,8

```

This listing is included in this month's cassette tape offer. See order form on Page 61.



● This month: Wheel of Fortune, Stranded, Ring of Time, Adventureland, Quest for the Holy Grail.

I'VE had a lot of letters (well, eight actually) from readers who can't get started with Epic's Wheel of Fortune. So this month I shall try and tell you how to do it — without telling you how to do it — if you know what I mean.

But first let me repeat something I said last month. Please enclose an s.a.e. if you want an immediate answer.

It takes time to get a magazine on the stands, time that you will spend waiting if you don't enclose an s.a.e.

Many readers have written in asking about Countdown to Doom. Although I have managed to get a couple of hours playing it, I have not yet received a review copy. Never fear, I shall review it as soon as it arrives.

Other things to look out for are reviews of all the Scott Adams' adventures, including



the one that started it all, Adventureland.

Back to Wheel of Fortune. To tell you exactly how to get down the well would require more space than I have available. I shall have to be brief and let you fill in the gaps.

The main thing to remember is that the characters move independently of you — but only to a point.

Search everywhere, collect everything but make sure you leave the gilded truncheon north of the crossroads before going west for the ladder.

You'll have to befriend the beggar because you need help to get down the well once you

have got the bucket.

Give the beggar the coin on his return trip from the machine. Once he has gone, get the coin from the cup, get the matches then get the beggar to follow you.

Use the ladder to get the bucket and go to the well.

To go down the well get the beggar to help you but then be very PATIENT. The exact sequence is: Get coin, befriend beggar, get matches, search everywhere, collect everything, go to the well and you are off. Hope that helps.

Incidentally, I haven't been able to do very much down the well so I'd appreciate any tips,

maps or advice that you'd care to offer.

Right. Problem corner now — see you next month!

Grail: *Yes! You PLANK.*

If the swamp leads anywhere in Epic's Quest for the Holy

P. Murogh wants to know the tree?

M. Byrom wants to know where the keys are in Adventureland: Have you been up

the game?

T. Healy cannot get past the crocodiles in Kansas's Ring of Time: Light Kill, then

you can get in and also finish the rifle and shoot the robot.

forests, find a place to use it, get the rifle and shoot the robot.

space ship in Superior's Stran-

S. Lurie can't get into the

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# Software Surgery

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## Ultimate Electron arcade action

**Zalaga**  
**Aardvark**

MY first reaction to this excellent game was "I'm not sure what's happening but it's fast". And that's my considered opinion as well.

The reason I'm not sure what's happening is that neither the cassette insert nor the program instructions give you any idea of the scenario.

Having said that, it doesn't take a lot of K to realise that the amazingly animated, ferociously fast objects swirling and swooping down from the top of the screen are nasties.

And any arcade novice should be able to realise that the laser base at the bottom of the screen can be moved from

set the reload speed.

But you have to discover for yourself what such things as automatic fire and the reload speed actually mean.

Not that you have much time to spend trying to find out, the game is too good for that.

It's entrancing. The graphics are superb, fast and effective. The control keys are easy to use and (remarkably) well explained and the game concept simple but appealing.

The idea of aliens dropping from the sky may be old fashioned but in Zalaga it reaches the state of the art.

It's a superb action game, flawed only by the lack of explanation. Even so it's thoroughly recommended.

Keith Young

## Cue for action

**Superpool**  
**Software Invasion**

HAVE you ever sneered when Steve Davis missed a shot and

announced to all and sundry "Even I wouldn't have missed that"? I know I have.

Well here's your chance to put your cue where your mouth is, because Software Invasion is giving you the opportunity to play Superpool.

Although not quite in the style or atmosphere of the Crucible Theatre, the game represents a pretty accurate simulation of a game of pool, with six balls, coloured and numbered, and a plan view of a pool table.

All these go to make an attractive and uncomplicated display, with the scoreboard along the top edge of your screen.

You sight your cue ball by moving an indicator along the cushion, and this is where the ball will strike, provided, of course, that there is not a ball in between, which in fact is your aim.

You select the strength of your shot, press Fire and, if you're like me, the white ball then goes into a pocket. Of course a coloured ball should go in, but then I don't need to explain the rules to you, I'm sure.

In the first frame it's made easy, and you can pot any ball in any order. In the second frame you have to pot the balls in number order.

In both these frames it doesn't matter if you hit any



other ball, but in the third frame you may only hit and pot the balls in number order.

There are keyboard or joystick options, and your shot is on a timed basis — run out of time and you lose a life.

All in all this is a very good game, but some things I found outflouting. I would have liked the option to remove the timer, because it is not always appreciated, especially in the beginner's game.

I was also a bit dubious about where the balls ended up when certain strengths were selected, and they also have a tendency to suddenly speed up when no other balls



side to side, avoiding bombs and replying in kind with lasers.

No, there's no problem with the game itself, a really fast example of ultimate Electron arcade action. It's just that the instructions are a bit of a puzzle.

You can have the sound on or off, decide whether you want the one or two player game, keyboard or joystick.

You can pick the start screen, whether you want automatic fire or not or even

**Spaceman Sid**  
**English Software**

AS Spaceman Sid you're sent to the planet Tribos to attempt to recapture the Martian-occupied dilithium crystal mines which are essential for Earth's defence.

Your only protection on this barren landscape is your XRS laser-armed Combat Rover.

As you proceed cautiously, jumping over pits, you are confronted by endless hazards — drones and enemy scout

ships are only two of the Martian dangers.

Land mines abound too, and there's nothing so unnerving as seeing your wheels dance into the air with gay abandon as you trip over an innocent-looking explosive.

And just wait until you get into the further sectors, where you're finally confronted by the dreaded bases of your fiery enemy.

Tempted? You should be. Any potential Sids out there will be positively riveted by this tricky little game.

The keys are easy to use. X speeds you forward, Z slows you down, while Shift certainly makes you jump. You tend to use Shift a lot.

Return releases the laser beam to burn the nasty green machines from Mars.

The three progressive levels of play and five sectors, combined with convincing graphics which give a 3D effect to the heavens, produce a fascinating and frustrating game which can keep the family amused for hours.

Keith Young

## Frustrating but fun...



## From Page 37

are involved.

Taking everything into consideration the pros outweigh the cons, and if you want a game that will keep you interested for hours on end you have to go far to find one better than this.

Adam Young



## Cut to the quick

**Sadim Castle**  
MP Software

IT'S three in the morning and I've just had my throat cut for the umpteenth time.

I've said before that these

MP adventures are getting better, and they are.

How the notting hill do I get through these gates? Why can't I get the shotgun off the farmer? Why don't I just give up and go to bed.

NEXT DAY: Aah... That's how it's done! What? Not again. Right. This time I give up. If anyone out there can solve this adventure - tell me how!

A long time ago Lady Leonara was left at home while her husband went off to war.

While he was gone she took a lover. But, alas, she was caught by Lord Sadim upon his return.

The enraged lord sealed her in her room and left her to die.

Many years later Lord Sadim is killed in an accident. As he lies dying a woman in white is seen laughing over his corpse.

Frequent sightings of this mysterious woman over the ensuing years convince the locals that she is the ghost of the Lady Leonara.

Seeing as how you flunked out with the Blue Dragon the locals offer you one final chance - redeem yourself or retire.

Can you enter the castle, overcome the dangers and give the lady her final peace? Probably not, but at least you can have fun trying.

You find yourself outside the west gate of the castle and

your nightmare begins...

The game follows the usual MP style of coloured messages and long descriptions. A departure from the norm is the use of real-time and character interaction.

If you sit pondering what to do you invariably see a "time passes..." message. This instils a feeling of panic.

The first time the monk "smiles sadly, blesses you and moves on" you'll be racing after him to try and find out what you should have done!

Two things I found while nosying through the program were the two commands VERSION and MODE. VERSION gave, "Version 1.1 MP software". MODE was a funny one, but it seems to switch between Mode 6 and Mode 7. Yes, I know we don't have Mode 7! Makes you think though, doesn't it?

I'm not sure I can give a valid verdict on this game as I didn't get far enough.

It seems quite hard and is therefore worth recommending, but it's a big but, you get your throat slit far too often for my liking.

At any rate it compares very well with similar types of adventures and, on balance, is a worthwhile addition to the collection.

Overall, MP adventures are always reasonably priced and as such, are definitely worth buying. Recommended.

Merlin



## Real ego buster

**Guardian**  
Alligata

BE warned - to play this game you need keen eyesight, quick fingers and lots of luck because here's a program that's determined to bust your ego. Mine went with a bang.

In possession of a fast moving spaceship you've got to stop the alien landers grabbing humans from the planet surface. If they manage to get back into outer space they mutate into pods, swarms and baiters and come for you.

There's wave after wave of the nasties and you need every one of your three lives as well as the three smart bombs to

# ELITE - THE ABSOLUTE 'MUST'

**Elite**  
Acornsoft

IT would be an understatement to say that this game has aroused a lot of interest in the computer world. It has already become Acornsoft's best-selling game and it is fast becoming a cult.

So much so that it has left owners of certain other machines wondering when they will be able to get their hands on it!

It comes in the most comprehensive packaging I have seen for a piece of software. Apart from the tape itself, there is a 64 page manual giving details of the game, a summary of the game keys (there are 47), and a short

novella, "The Dark Wheel", which is meant to whet your appetite for the game.

There is even a ship identification wall chart! All this makes the somewhat expensive price look quite reasonable.

Elite has all the addictive qualities of an arcade space battle plus the intellectual challenge of a strategy game.

You play the part of a space trader roaming the galaxy selling your wares from planet to planet with the view of making as much money (credits) as you can.

These credits can then be used to equip your Cobra MkII space ship. Things to buy include an extra large cargo bay, an extra energy unit

and docking computers (essential as manual docking is very long and difficult).

You can also gain credits by shooting down pirate ships and the many asteroids that float aimlessly about.

Shooting down innocent traders or dealing in illegal items (narcotics and slaves) reaps you large profits.

Unfortunately it also brings you to the attention of the police Viper ships.

The kills contribute to your rating, which ranges from harmless through mostly harmless, poor, average, above average and competent.

As your bag grows next comes dangerous, then deadly and finally, after a lot of shooting, you become one of

the elite.

Fortunately there is a save game option, enabling you to rest your aching fingers.

You may think that having to use 47 keys in its playing makes controlling the program complex and difficult. This is not so, as many keys are only used on certain occasions.

Having said that, I must admit that at first I found flying my ship quite difficult.

The 3D graphics are stunning and the sound well above average.

The game has an addictive quality which keeps you at the keyboard for hours in the hope of achieving elite status.

No software collection is complete without it.

Ian Critchley



survive for any length of time. The more aliens you get the more you score – sadly they seem to be on the same bonus scheme.

It's a fast moving space game with striking graphics and excellent sound effects. Kids of all ages will love it.

**Keith Young**

## Untidy but tempting

**Staff of Law  
Potter Programs**

**STOP!** Hands up those of you who have never heard of Thomas Covenant.

Right! I hereby banish you from this review. Read the next one. It's about frogs or gorillas or something.

As the rest of you are aware, Stephen Donaldson is the best writer of the century and the Thomas Covenant books are the greatest work of fiction ever.

Who? Tolkien? Never heard of him.

Anyway, take another look at the title of this adventure. Ring any bells? Correct. Well, the bad news is that although the story-line originates from the Unbeliever series, it is not about him.

You will meet Mhoram, or Moram as he is called here, and the Despiser, but Hile Troy, Elena, the Forestals, Ravens and the rest are missing.

You play the part of the "Chosen" (minus ring). You've been summoned by the high council where you're informed that you are the only one who can defeat the Despiser and return the Staff of Law to Andelain, I mean, Arda.

Here all similarities between the books and this game end. You're now faced with an extremely fiendish adventure during which you'll learn to wire-walk and dive from great heights.

I won't give you any clues, but you will need to know what a dumb waiter is.

There were, however, several things I didn't like. Mode 4 for example. What's wrong with Mode 6?

Also there's no save game facility, surely a definite must

for an adventure? And you have to type in nouns in full, for example DRAWBRIDGE. Try typing that in a few times.

Also there are spelling mistakes. Suddenly "You hear a LOAD crash"! Mind you, the way my cassette recorder's been playing up recently, they could be right.

If it seems that I've pulled this adventure to bits, rest assured that, considering the complexity of the plot, these criticisms are a minor consideration.

Also the program is written in Basic and therefore fairly easy to change anyway.

On the plus side is the skill and inventiveness shown by the programmers. Solving this game requires a great deal of thought, as most of the problems will be new to you.

Happily, Potter Programs offers a help service for this and their other adventures – one that I expect will be much used.

An excellent adventure that, although it would benefit from tidying up, is still well worth buying. **Merlin**



## Flexible quiz

**Answer Back Quiz  
Junior version  
Kosmos Software**

THIS series of programs was first designed for the over-twelves. This latest version is for 6 to 11-year-olds and contains a completely new range of topics.

On the cassette are the master program and 15 files of questions, each containing 50 programs on the particular topic.

Topics included on the tape include: nature, music and nursery rhymes, lucky dip, famous people, science, the

British Isles, word fun, around the world, brain strainers, games and sport, books and poetry, fun-sums, TV, films and theatre, spelling and take your chance.

The master program not only presents the questions on file but enables the user to create their own files.

This is an excellent piece of software for the home and school. It can be modified and expanded to meet the needs of the individual user.

The various options have very clear and specific instructions and can be used by someone not familiar with the inner workings of a computer.

They offer a flexibility not often found in such programs.

The child user also experiences a well constructed screen format with a variety that continues to stimulate.

All questions are stored in the file with four answers – one answer correct, the others wrong. This enables the com-

puter to present three different types of questions:

- Multiple choice – the user presses A, B, C or D.
- True or false – one answer appears, the user says whether it is correct or not.
- Complete the answer – the user has to fill in missing letters.

In a fourth option the computer presents a selection of different types of questions.

If an answer is correct then the user has the opportunity of saving the princess by dropping from the hot air balloon a sandbag to land on top of the dragon.

This encourages children who don't like answering questions alone.

My experience has been that the killing of dragons is not necessary but it does not distract from the quiz itself.

This is an excellent package and it should find its way into many homes and schools.

**John Woollard**

## Let's go crock a Krackat

**Rubble Trouble  
Micro Power**

HAVE you ever felt the irresistible urge to pick a fight with a Krackat? No? Then for a new experience, try this game for size.

The world's a mess after a nuclear holocaust and things aren't made any better by mutant flesh-eating turtles called Krackats.

As seems to be the way of things in computer games, you find yourself in a maze, the walls of which are made of boulders.

Your only hope of survival is to use them to crush the little nasties and so gain points.

As if this wasn't enough, a little gauge at the top of your screen tells you the background radiation level. When this gets too high, it's curtains for you. Time is of the essence.

You can push a boulder unless it's blocked by another. In which case, the boulder itself will be crushed. Beware if you miss a Krackat, as the boulder will bounce back and crush your frail bones.

Also avoid boulders marked D, as these contain a bomb and don't like being pushed around. Should you survive all

this a bonus life is given at 6,000 points.

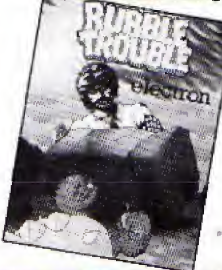
The keys are standard – Z and X are for left and right, / and : for up and down. To push a boulder, just stand next to it and hit your Return key.

There are three levels, one of which is ominously entitled the Vanishing Maze.

It's a game to keep all ages amused for hours on end. The first rate graphics really enhance its enjoyment and the sound effects are particularly good as is the music accompanying the instructions.

Despite the dreadful scenario it's a great game.

**Keith Young**





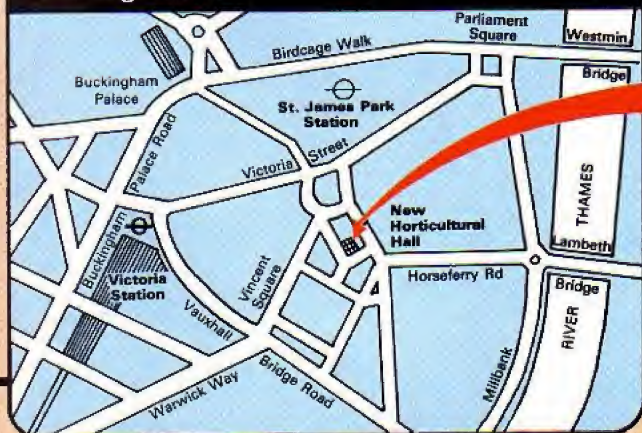


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# STAR CHART

By  
ROG FROST

## PROCEDURES

**PROCIntro**

Sets up arrays and reads in data of constellation names, number of stars in constellations and at which line number star data is held. It also prints up instructions and accepts day and date inputs to work out the value of *offset%*. Draws the blue circle.

**PROCcircle**  
**PROCconst**

Collects the data to place each star in the constellation.

**PROCstar\_place**

Converts the polar coordinates for each star into screen coordinates and plots each star.

**PROChorizon**  
**PROCselect**  
**PROCdelay**

Draws the horizon line.  
Allows a chosen constellation to flash.  
Keeps stars flashing for five seconds.

## ARRAYS

**names\$**  
**no\$**  
**restore%**

Name of constellation.  
Number of stars in constellation.  
Program line at which DATA is stored.

IF you are interested in Astronomy this program is for you. It draws stars — about 200 in all — that are visible in Great Britain.

It is set for Birmingham's latitude but it will be reasonably accurate for anywhere in the British Isles. The stars are grouped in 29 constellations.

Because of the earth's movement around the sun and its spinning rotation we cannot, of course, see all the stars at the same time.

The program draws a second, smaller, circle to include the stars visible at the time and date entered.

A list of constellations is put on the screen, and by using a moving symbol any constellation name can be selected and its stars made to flash.

Incidentally, it is the normal convention for star charts to have North at the bottom because star charts are viewed from below.

Most variables have been given appropriate names and explain themselves.

*offset%* is set by *day%* and

*time%*. It is an angle used to rotate the stars to a position suitable for that day and time. 90 is added as a "fiddle factor" to get the stars in the right place.

The variable *day%* is calculated on the basis of 12 months of 30 days. Real astronomy purists might like to remove that minor source of error.

*DELAY%* at line 590 is set to loop up to 200. This program was written on an Electron. Users of BBC Micros might find a value of 500 easier to manage.

*X%* and *Y%* at lines 450/460 are multiplied by 4.5 because the radius of the chart the information was taken from is 100mm and the radius of the computer chart is 450 screen units.

There is one problem with typing in the program. RESTORE numbers are stored as DATA in the program and the renumber command cannot cope with this.

Therefore on no account renumber the program.

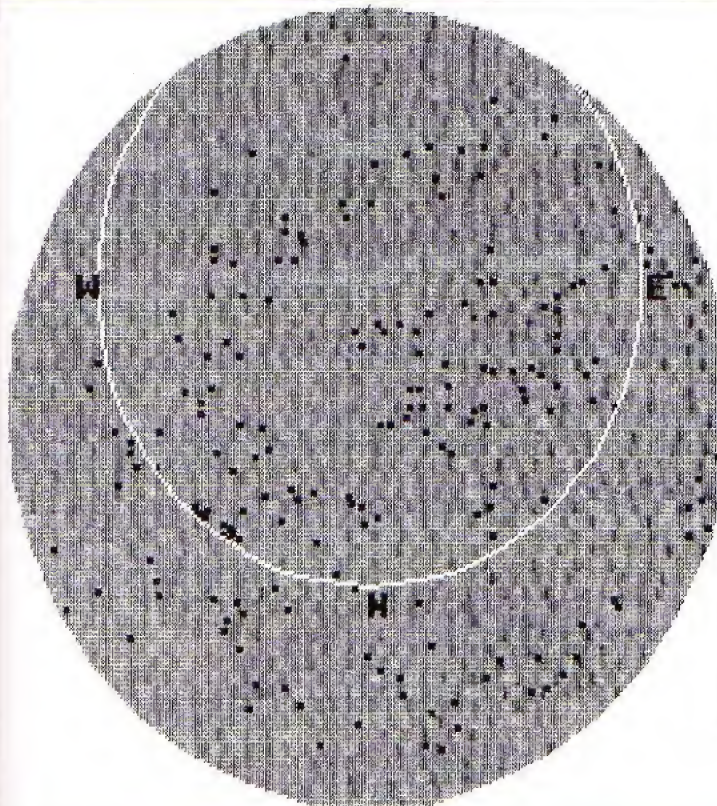
## Star Chart listing

```

10 REM STAR CHART          (const%),restore%(const%),n
20 REM By Rog Frost        aae%(const%)
30 REM (C) ELECTRON USE    170 RESTORE restore%(const
R                               t%)
40 REM                     180 GCOL0,col%
50 MODE$                   190 FOR star%=1 TO no%(const
60 PROCIntro               t%):READradius%,angle%
70 MODE1                   200 PROCstar_place(radius
80 PROCcircle              %,angle%)
90 FOR const%=1 TO 29      210 NEXT
100 PRINTnames$(const%)    220 ENDPROC
110 PROCconst(3,no%(const  230 DEFPROCcircle
%,restore%(const%),name$(c  240 VDU23;8202;0;0;0;
onst%))                    250 VDU19,1,4,0,0,0
120 NEXT                   260 VDU19,2,11,0,0,0
130 PROChorizon            270 VDU28,28,31,39,0
140 PROCselect              280 VDU29,450;555;
150 END                     290 R%:=450
160 DEFPROCconst(col%,no%  300 PRINT
                               310 GCOL0,1
                               320 MOVE0,R%
                               330 FORrotate%=0 TO 360 STEP
18                               18
                               340 IX=SINRAD(rotate%)*R%
                               :YI=COSRAD(rotate%)*R%
                               350 MOVE0,0;PLOTBS,IX,YI
                               360 NEXT
                               370 VDU29,450;555;
                               380 MOVE0,0
                               390 ENDPROC
                               400 DEFPROCdelay
                               410 TIME=0:REPEATUNTILTI
E580                          420 ENDPROC
                               430 DEFPROCstar_place(rad
ius%,angle%)
                               440 VDU5
                               450 IX=SINRAD(angle%*offs
et%)/radius%+4.5
                               460 YI=COSRAD(angle%*offs
et%)/radius%+4.5
                               470 MOVEIX,YI:PRINT".*
                               480 VDU4
                               490 ENDPROC
                               500 DEFPROCselect
                               510 ypos%=1
                               520 REPEAT
                               530 COLOUR8:PRINTTAB(11,y
pos%)*"
                               540 IF INKEY(1) ypos%=yp
os%+1
                               550 IF ypos%>29 ypos%=1
                               560 COLOUR2:PRINTTAB(11,y
pos%)*"
                               570 #FX1,0
                               580 IF INKEY(74)PROCcons
t(2,no%(ypos%),restore%(ypo

```





Sagittarius  
Ursa Major  
Ursa Minor  
Pegasus  
Leo  
Aquarius  
Cygnus  
Capricorn  
Draco  
Gemini  
Taurus  
Orion  
Scorpio  
Virgo  
Hercules  
Cassiopeia  
Persius  
Libra  
Pisces  
Aries  
Eridanus  
Bootes  
Auriga  
Canis  
Hydra  
Serpens  
Ophiuchus  
Cancer  
Cetus

```

sZ),name$(yposZ)):PROCdelay
:PROCconst(3,noZ(yposZ),res
toreZ(yposZ),name$(yposZ))
590 FOR DELAYX=0TO200:NEX
T
600 UNTIL0
610 ENDPROC
620 DEFPROCChorizon
630 BCDBL0,0
640 VDU29,450;690;
650 MOVED,340
660 FOR horizonX=0TO360ST
EPS
670 XX=SINRAD(horizonX)*3
40
680 YY=COSRAD(horizonX)*3
40
690 DRAWIX,YI
700 NEXT

```

```

710 VDU5:BCDBL0,3;MOVE-4,-
350:PRINT"W":MOVE-340,8;PRI
NT"W":MOVE342,8;PRINT"E":VD
U4
720 VDU29,450;555;
730 ENDPROC
740 DEFPROCIntro
750 DIMnoZ(30),restoreZ(3
0),name$(30)
760 FOR NX=1TO29:READnoZ(
NX),restoreZ(NX),name$(NX):
NEXT
770 DATAB,920,Sagittarius
,7,930,Ursa Major,7,940,Urs
a Minor,7,950,Pegasus,9,960
,Leo,9,970,Aquarius,5,980,C
ygnus,6,990,Capricorn
780 DATA1,1000,Draco,7,1
010,Gemini,5,1020,Taurus,7,

```

```

1030,Orion,6,1040,Scorpio,9
,1050,Virgo,11,1060,Hercule
s,5,1070,Cassiopeia,12,1080
,Persius
790 DATA3,1090,Libra,3,11
00,Pisces,2,1110,Aries,7,11
20,Eridanus,6,1130,Bootes,6
,1140,Auriga,4,1150,Canis,7
,1160,Hydra,6,1170,Serpens,
4,1180,Ophiuchus,4,1190,Can
cer,12,1200,Cetus
800 VDU19;4;0;
910 PRINTTAB(15,1)"STAR C
HART"TAB(15,2)*****
820 PRINT" This program w
ill draw stars which"" are
visible in the Northern""
Hemisphere."" You must e
nter the time on the 24 hr"

```

" clock as Greenwich Mean Time. If it"" is British S ummer Time subtract one"" hour to obtain G.M.T."s  
830 PRINT" You must also"" enter the month (1-12) a nd the date in that mon th. After all stars are"" drawn a horizon is added. T his has"" north at the bot tom, west at the"" left an d east at the right."  
840 PRINT" A list of con stellation names will"" ap pear at the right with a fl ashing"" star at the side. Press Return to see that



## Star Chart listing

### From Page 43

constellation. Press Shift to move the star down wards."

85B PRINTAB(3,23)\*PRESS  
SPACE TO CONTINUE:REPEATUN  
TILBET=32:CLS

86B INPUT""What is the time to the nearest hour?"

time1  
87B INPUT""What month is it?"month1

88B INPUT""What date is it?"date1  
89B day1=(month1-1)\*31+date1

90B offset1=(time1+5+day1)\*90

91B ENDPROC  
92B DATA90,286,94,284,88,  
282,91,288,89,277,97,274,94,  
273,95,278

93B DATA20,161,24,161,25,  
176,23,180,25,190,25,288,38,  
284

94B DATA8,0,3,270,7,255,1  
2,246,9,241,14,238,12,222

95B DATA35,29,48,16,42,8,  
58,2,46,0,46,345,57,344

96B DATA50,143,47,147,55,  
149,58,150,58,152,52,152,52,  
167,56,167,55,175

97B DATA75,310,73,321,68,  
329,70,333,73,342,79,342,83,  
346,74,347,81,349

98B DATA49,291,35,295,37,  
383,42,310,35,389

99B DATA78,382,80,383,88,  
315,81,319,81,323,79,326

100B DATA20,289,23,228,21,  
242,19,254,13,278,18,288,21,  
288,25,267,29,268,26,260,2  
9,268

101B DATA50,91,58,94,55,96,  
48,98,51,187,43,111,47,113  
102B DATA55,62,54,63,56,64

,53,64,56,66  
103B DATA75,76,63,78,69,79,  
70,82,78,84,62,86,74,86

104B DATA96,243,91,246,89,  
245,88,243,84,248,86,238

105B DATA65,176,68,184,78,  
189,63,192,59,195,72,196,75,  
200,68,202,85,210

106B DATA32,242,54,244,34,  
246,52,247,39,249,44,249,46,  
253,48,256,58,257,48,260,4  
7,264

107B DATA24,0,26,8,22,13,2  
2,20,20,25

108B DATA26,45,37,47,38,49,  
49,52,51,53,50,55,49,55,52,  
55,58,56,37,58,44,58,51,58

109B DATA88,221,84,229,88,  
232

110B DATA62,358,64,353,68,  
353  
111B DATA53,27,51,33  
112B DATA88,59,73,53,74,56,  
89,68,73,68,99,68,76,69

113B DATA53,213,38,216,45,  
216,47,228,37,223,41,227

114B DATA43,72,56,75,32,76,  
46,79,33,85,39,87

115B DATA82,94,88,99,68,10  
9,64,113

116B DATA62,129,63,131,74,  
139,76,158,92,172,86,199,90,  
210

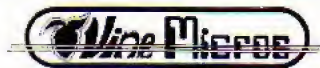
117B DATA58,235,64,235,54,  
235,66,236,75,236,56,238

118B DATA62,253,58,256,59,  
262,65,264

119B DATA57,122,58,127,44,  
132,57,132

120B DATA75,3,82,10,74,16,  
71,28,88,25,74,26,69,33,61,  
37,68,38,65,39,60,48,64,45

This listing is included in this month's cassette tape offer. See order form on Page 61.



### ELECTRON OWNERS .....

If you are thinking of expanding the capabilities of your Electron computer your first choice should be the ADDCOMM ROM.

ADDCOMM is now well established with BBC 'B' owners and the same chip is used with a ROM board to increase the Electron's BASIC language by forty new commands.

These new statements cover a wide range of utilities such as GRAPHICS, where eleven commands enable any shape to be drawn any size and filled with any colour combination (choice of 2 billion in Mode 2), more easily and faster than you thought possible. The TOOLKIT commands include 'find' and 'replace' statements, and a very efficient 'compact' command all of which put ADDCOMM into the top league of a recent Toolkit comparison review. The GENERAL PURPOSE statements include a sorting routine, and the ability to set up to seven windows on the screen — each with its own cursor. Split listing and jumping to a line via a label are also some of the other useful additions in this section. Eight LOGO GRAPHIC statements provide the necessary routines that when combined with BBC BASIC and ADDCOMM'S enhanced graphics give an exceptional Logo Graphics system.

ADDCOMM is available from Vine Micros, Marshborough, Nr. Sandwich, Kent, CT13 0PG. The price of £28.00 includes V.A.T. and first class post, or, if you would like more details, send a stamp for the sixteen page brochure which includes recent reviews.

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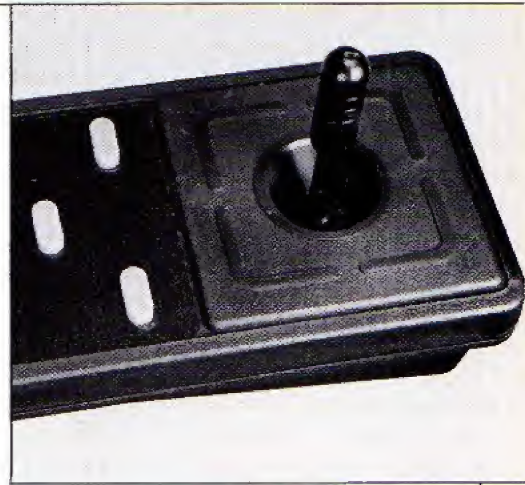
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# More joy on Plus 1

Are you a Plus 1 owner who wants to expand the number of programs available to you? PAUL JOHNSON of Micro Power comes to your aid



AS the majority of commercial games programs for the Electron were written before the release of the Plus-1, many fail to use it to its full potential.

Most of these programs only work from the keyboard and don't take advantage of the joystick option.

Also, the effect of the Plus-1 can slow down the Electron, which has caused some loading difficulties in the past.

It was to help solve these problems that the program listed here — Joyplus — was written.

It has data for 20 out of the 23 Micro Power games that use joysticks and it can be used for other software houses' games as well.

The missing three MP games — Swag, Frenzy and Cybertron Mission — have had to be omitted owing to one or more of the following reasons:

- The game doesn't leave enough memory for the machine code.
- The game doesn't scan for a key using INKEY.
- The game already works with the Plus-1.

To use the program simply CHAIN it before loading the game you are about to use. That is, you enter:

## CHAIN "JOYPLUS"

and press the Return key.

You'll then be presented with a menu consisting of 20 program titles. Simply type the number relating to the game you want to play.

The program will then set up the appropriate code within the machine and ask you to load the game in the normal way.

One other option presented

along with the menu allows you to define your own keys for a game not listed in the menu.

To use this option type D followed by Return. You'll then be requested to enter a location for the machine code. If in doubt type in 110 followed by Return.

The next request for information relates to the way in which the program scans for a key. The most common method is using negative INKEY, so type N followed by Return.

You'll then be asked to type in the keys of your choice. If a key is not used, type in -, that is, a hyphen.

This ensures that the code will not scan for the unwanted movements on the joystick, saving memory and giving the program a better chance of working first time.

Should the options you have entered not work satisfactorily then you will have to re-load the conversion program and try alternative memory locations.

Failing this, type P instead of N as the method of scanning for a key. If, after all this, the game still does not work then it will probably not be compatible with the Plus-1.

When using games it is necessary to start as if you were about to play the game using the keyboard.

You will find that the keys have no effect and that the relevant movements now correspond to the joystick movements.

Some of the more recent Micro Power games ask you if you wish to use joysticks. This refers to switch type interfaces only, so answer no to this question and then the game

will load as normal.

Any type of joystick, potentiometer or switch type, may be used providing that it is compatible with the Plus-1.

This is how the program works:

All games need input of some kind from the user. The most common way is to scan the keyboard using the INKEY command (equivalent to \*FX129) or OSBYTE with A=8B1.

When an INKEY command is executed the machine will automatically jump to a location in ROM.

The address is stored as two bytes in locations &20A and &20B.

If a new address is entered into these bytes it can point to the start of a piece of machine code in memory rather than a location in ROM.

Instead of scanning the keyboard for a keypress, this new code scans the joystick port for a reading.

When it's got a reading it is treated as if it were a key being pressed rather than the joystick being moved.

The program gets round the effect of the Plus-1 slowing the machine down by disabling the Plus-1 and reading the value of joystick directly from the operating system.

This leaves the Electron's speed unaltered.

## Plus 1 listing

```
10 REM JOYPLUS
20 REM Plus-1 Joystick C
30 REM Version II
40 REM Written by Paul
   Johnson
50 REM
60 DIM neg(5),key(5),A$(5)
70 MODE1
80 VDU19,8,4;0;23,208,25
90 PROCsetscreenup:FORJ1=1T
   D20:RESTORE(1530+(J1*10)):R
   EAD$
90 PRINTTAB(5,4;J1);J1;"
   ":PRINTTAB(10,4;J1);A$;"."
   :NEXT
100 PRINTTAB(5,26);"D to

define keys."
110 INPUTTAB(5,28);"Pleas
e choose 1-20 ",A$
120 IF A$="D" THEN PROCdefin
e:GOTO280
130 IF VAL(A$)<10 THEN VAL(A$)>
20 THEN VDU17:GOTO110
140 RESTORE(1530+(VAL(A$)
*10)):READA$
150 FOR IZ=1T05
160 READkey(IZ),neg(IZ)
170 NEXT
180 READaddress
190
200 REM *** Disable Plu
s-1 ***
```



From Page 45

```

210
220 ?20212=kD6
230 ?20213=kF1
240 ?20214=k0
250
260 REM *** Main loop *
***
270
280 MODE4
290 FOR I%=0 TO 255
300 b1=key(1):b2=key(2):b
3=key(3):b4=key(4):b5=key(5)
310 PROCinitiate(neg(1),n
eg(2),neg(3),neg(4),neg(5),
key(1),key(2),key(3),key(4)
,key(5))
320 PROCcheckjoystick
330 NEXT I%
340
350 REM ** Re-Point wher
e OSBYTE is **
** indirected. **
360
370 ?2020A=START MOD 256: ?2
20B=START DIV 256
380 VDU1,1,2,0,:IF A$=""
THEN 390 ELSE PROCdouble(A$
)+,-,0,2)
390 PROCdouble("Now load
the game as normal.",0,5):P
RINT:END
400
410
420
430
440 DEFPROCinitiate(A1,B1
,C1,D1,E1,A,B,C,D,E)
450 IF Address=110 THEN P%=%
151 ELSE P%=EVAL("k"+STR(ad
dress))
460 ordinary=?202A+(?202B
+256)
470
480 START=P%
490 LOPT I%:START:CMF#B
1:BNE continue:XA:PHA:.xx1
:JMP NEG:continue:JMP ordi
nary.NEG:1
500 IF A1(<255 THEN LOPT I%:
CPY#&100-A1:BNE N1:JSR u:JM
P negpos.N1:1
510 LOPT I%:0D21:IFB2(<
255 THEN LOPT I%:JSR u:CMF#F
F:BEG checker:1
520 IFB1(<255 THEN LOPT I%:
CPY#&100-B1:BNE N2:JSR r:JM
P negpos.N2:1
530 LOPT I%:0D1:IFB3(<
255 THEN LOPT I%:JSR r:CMF#F
F:BEG checker:1
540 IFC1(<255 THEN LOPT I%:
CPY#&100-C1:BNE N3:JSR d:JM
P negpos.N3:1
550 LOPT I%:0D3:IFB1(<
255 THEN LOPT I%:JSR d:CMF#F
F:BEG checker:1
560 IFD1(<255 THEN LOPT I%:
CPY#&100-D1:BNE N4:JSR l:JM
P negpos.N4:1
570 LOPT I%:0D:IFB4(<2
55 THEN LOPT I%:JSR l:CMF#F
F:BEG checker:1
580 IF E1(<255 THEN LOPT I%:
CPY#&100-E1:BNE N5:JSR fire
:JMP negpos.N5:1
590 IFB5(<255 THEN LOPT I%:
JSR fire:CMF#FF:BNE OOF:LD
Y#0:CLC:JMP 0D4:OOF:JMP no
real:1
600 LOPT I%:JMP normal:c
hecker:JMP 0D4:1:IF Address=i
10 THEN P%=?207F
610 LOPT I%:negative:LDX
#0:LDY#0:JX1:PLA:LD#&B1:
RTS:positive:LDY#&FF:LDX#&
FF:BNE JX1
620 :negpos:CMF#0:BEG neg
ative:BNE positive:1
630 ENDPROC
640
650
660
670
680 DEFPROCcheckjoystick
690 IF Address=110 THEN P%=%
300
700 LOPT I%
710 fire:LDX#B5:LD#&FC72
:AND#B5:CMF#0:BNE 0D:BEG FF
720 :r:LD#&4:JSR calcjoys
tik:LDX#B2:CMF#B5:BCS 0D:BC
C FF
730 :l:LD#&4:JSR calcjoys
tik:LDX#B4:CMF#170:BCC 0D
740 :FF:LD#&FF:RTS:0D:L
DA#0:RTS
750 1:IF Address=110 THEN P%
=%800
760 LOPT I%
770 d:LD#&5:JSR calcjoys
tik:LDX#B3:CMF#B5:BCS 0D:BC
CC FF1
780 :u:LD#&5:JSR calcjoys
tik:LDX#B1:CMF#170:BCC 0D1:
BCS FF1
790 :calcjoystik:STA#FC70
:L:LD#&FC72:AND#&4:BNE L:L
DA#FC70:RTS
800 :FF1:LD#&FF:RTS:0D1
:LD#&0:RTS
810 1:IF Address=110 THEN P%
=%120
820 LOPT I%:normal:PLA:T
AX:LD#&B1:JMP ordinary:0D
4:LDY#0:CLC:PLA:RTS:1
830 ENDPROC
840
850
860
870
880 DEFPROCsetscreenup
890 CLS:COLOUR2:PROCdoubl
e("Electron User",13,2):COL
OUR1:COLOUR130:FOR I%=0 TO 39:
VDU3,1X,0,208,31,1X,30,208
:NEXT:FOR I%=0 TO 39:VDU3,0,I
X,208,31,39,1X,208:NEXT:COL
OUR128:COLOUR3:ENDPROC
900
910
920 DEFPROCdouble(A,X,Y)
930 FOR I%=1 TO LEN(A$):A%=%
A:Y%=%Y:Z%=?2F: ?2F#0=ASC(IN
D(A$,I,1)):CALL#FF1:VDU2
3,224, ?2F#0, ?2F#1, ?2F#2,
?2F#2, ?2F#3, ?2F#3, ?2F#4,
?2F#4, 23, 225, ?2F#5, ?2F#
5, ?2F#6, ?2F#6, ?2F#7, ?2F#
7, ?2F#8, ?2F#8:PRINTTAB(I
X+I%-1,Y):CHR#224
940 PRINTTAB((X+I%-1,Y+1
):CHR#225:NEXT:ENDPROC
950
960
970 DEFPROCdefine
980 CLS:PROCsetscreenup
990 INPUTAB(5,7):"Type i
n where to locate the code"
;TAB(8,9):" (i.e. 110,900,55
00)" :address
1000 INPUTAB(5,12):"Does
the program scan for a key"
;TAB(7,14):"using -ve INKEY
or ordinary";TAB(15,16):"I
NKEY (N,P), 1:IF I1(<"N"AND
I2(<"P" THEN 1000
1010 SOSU1100
1020 IF I1="N" THEN FOR I1=1 TO
5:neg(I1)=255:key(I1)=p(I1)
5:neg(I1)=255:key(I1)=p(I1)
:NEIT
1040 A$=""
1050 ENDPROC
1060
1070
1080
1090
1100 IF I$="N" THEN PROCnegin
key
1110 IF I$="P" THEN PROCnorma
key
1120 RETURN
1130
1140
1150
1160 DEFPROCneginkey
1170 PROCsetscreenup
1180 RESTORE1260:PRINTTAB(
2,7):"Define your keys:-":F
OR I1=1 TO 5:READA$(I1):NEXT:F
OR I1=1 TO 5:PRINTTAB(2,8+(J%*
2)): "Press the key to use f
or ";A$(J1):TAB(31):FOR I1=
1 TO 1000:NEXT
1190 FOR I1=-1 TO -122STEP-1
1200 IF INKEY1 THEN A1=I1:I%
=-122:NEXT:GOTO1220
1210 NEXT:GOTO1190
1220 p(J1)=-(A1):RESTORE12
70:FOR I1=1 TO -(A1):READA$:N
EXT:IFAAS="" THEN I19ELSEPRI
NTAAS:IFAAS="" THEN p(J1)=25
5
1230 NEXT
1240 #FX15.1
1250 PRINTTAB(6,25):"Are t
hese keys correct (Y/N)?":A
$=BET$1:FA$="" THEN I170
1260 DATA Up,Right,Down,Le
ft,Fire
1270 DATA Shift,Ctrl,.....
1280 DATA Q,W,E,R,T,Y,
-,Left
1290 DATA ,,,,B,M,W,E,T,7
1,9,0
1300 DATA ,Down,,,,,,1
1310 DATA D,R,D,R,U,D,P,C,
Up
1320 DATA ,,,,Caps,A,X,F
,Y
1330 DATA J,K,L,Ret,,,,,
1340 DATA ,Lock,S,C,G,H,M,
L,,,
1350 DATA Del,,,,,,Tab,Z,

```



```

Spce
1360 DATA V,B,M,,,.,Copy
,,,
1370 DATA ...,Escape,f1,f2,
f3,f5,f6,f8
1380 DATA f9,\,right,
1390 ENDPROC
1400
1410
1420
1430 DEFPROCnormkey
1440 PROCsetscreenup
1450 RESTORE1490:PRINTTAB(
2,7);"Define your keys:":F
ORJZ=1TOS:READA$(I);NEXT:F
ORJZ=1TOS:PRINTTAB(2,8+ (JX*
2));"Press the key to use f
or ";A$(JX);TAB(31);:FORJZ=
1TO1000:NEXT
1460 A$=GET$:PRINTA$:IFA$=
""THENP(JX)=255:NEXTLSEP(
JX)=ASC(A$):NEXT
1470 #FIX15.1
1480 PRINTTAB(6,25);"Are t
hese keys correct (Y/N)?":A
$=GET$:IFA$="N"THEN1440
1490 DATA Up,Right,Down,Le
ft,Fire
1500 ENDPROC
1510
1520 REM *** Data for ga
mes ***
1530
1540 DATA "Bandits at 3 0'
clock",255,66,255,255,255,9
8,255,255,255,67,110
1550 DATA "Bumble Bee",255
,73,255,67,255,105,255,98,2
55,255,110
1560 DATA "Croaker",65,255
,77,255,90,255,78,255,255,2
55,900
1570 DATA "Danger UXB",255
,73,255,67,255,105,255,98,2
55,255,110
1580 DATA "Electron Inva
ders",255,255,255,67,255,255,
255,98,255,1,110
1590 DATA "Escape from Moo
nbase Alpha",255,73,255,67,
255,105,255,98,255,56,110
1600 DATA "Felix and the E
vil Weevils",255,73,255,67,
255,105,255,98,255,74,110
1610 DATA "Felix and the F
ruit Monsters",255,66,255,4
2,255,98,255,56,255,30,900
1620 DATA "Felix in the Fa
ctory",255,66,255,42,255,98
,255,56,255,30,900
1630 DATA "Galactic Comm
ander",255,255,255,51,255,255
,255,66,255,74,110
1640 DATA "Gauntlet",255,6
6,255,1,255,98,255,99,255,7
4,110
1650 DATA "Ghouls",255,255
,255,67,255,255,255,98,255,
74,110
1660 DATA "Jet Power Jack"
,255,255,255,66,255,255,255
,2,255,74,900
1670 DATA "Killer Gorilla"
,255,73,255,67,255,105,255,
98,13,255,900
1680 DATA "Moonraider",255
,82,255,104,255,67,255,103,
255,66,110
1690 DATA "Positron",255,2
55,255,66,255,255,255,2,13,
255,2900
1700 DATA "Rubble Trouble"
,255,73,255,67,255,105,255,
98,255,74,5500
1710 DATA "Stock Car",255,
17,255,67,255,66,255,98,255
,255,110
1720 DATA "Swoop",255,255,
255,67,255,255,255,98,255,1
,110
1730 DATA "The Mine",255,7
3,255,67,255,105,255,98,255
,74,110

```

*This listing is included in  
this month's cassette  
tape offer. See order  
form on Page 61.*

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# Micro Messages

## Don't knock Elite and the Electron

I REALLY must complain about D. Fiveash's letter in the February issue which warns of the Electron Elite.

Firstly, how can anybody expect a computer such as the Electron to have the same capabilities as a computer twice its price, such as the BBC B?

This point has annoyed me constantly. Why can't people, magazines mainly, see that the Electron is a computer, not a cut down BBC B?

Secondly, the Electron version of Elite is magnificent, addictive, including fantastic 3D graphics which would only be expected on a machine with a much larger memory.

No colour is needed, and actually makes the control panel easier to read - which is the only part coloured on the BBC B version anyway.

I don't have flashing on my version and there still is a lot of ships considering the 3-dimensional effects which are unreal.

As to the faulty hyper-drive, Acornsoft will replace old copies for the new one without the bug, as reported in the news section of the February issue.

Even so, the one galaxy available because of the bug is so large, with so many planets, that another galaxy is not really necessary anyway.

Elite is the best graphic arcade/adventure game available on the Electron, and probably all other home computers (apart from the Beeb, of course). Worth every penny. - Mark Turner, Melton, North Humberside.

● You don't happen to have a relation at Acornsoft, do you?

### Super battle in space

I FELT I must write to congratulate you on your excellent listing of Space Battle in January's edition of Electron User and feel that this game, used in conjunction with "Plus 1" and joystick is as good if not better than many

commercially available tapes.

So please let's have more listings compatible with Plus 1 and if possible a listing to enable joystick control of some of your programs from earlier editions.

I feel longer listings are worth all the late nights or early mornings if the end result is as good as Space Battle. For people who dislike typing in long listings your monthly cassette offer must represent excellent value for money.

Keep up the good work - B. Matthews, Wrexham.

### Loading snag solved

I BELIEVE I have found a solution to Roland Waddilove's problem of not being able to load programs in Modes 1 and 2 with the Plus 1 fitted, without turning off the joystick option.

The solution is to generate a \*FX16,4 call after the program is loaded and running, by using

an interrupt:

```

5 ?%220=0;?%221=9;?FX14
,2
10 FOR IX = 0 TO 3 STEP
3
20 PI=4900
30 I
40 OPT IX
50 CLD
60 PHA:TXA
70 PHA:TYA:PHA:PHP
80 CPM #74
90 BNE end
100 LDA #16:LXI #4:LDY #0
:JSR #FFFA:FX16,4
110 .end PLP:PLA:TYA:PLA:
TAX:PLA
120 RTS
130 ]
140 NEXT
150 PRINT"Press 'J' after
program loaded and running
":FX16,0
160 CHAIN**
    
```

Line 5 of the program changes the interrupt vector and enables the 'key pressed'

event.

This program should be run before chaining the software. The J key must be pressed to enable the joysticks after the software has been chained. - Sandesh Alavani, Harrow, Middx.

### Shifty tactics

IN your February edition someone asked how to beat the long jump in Micro Olympics.

I've found if Return, Delete and Shift are depressed when the computer is running, his motion is stopped.

So if you press then depress in quick succession (so the motion is almost frame by frame) then stop doing this when he is near the line he only jumps 3 or 4 metres, so you can beat him. It works great - Alan Berry, Alexandria, Scotland.

● Cheats never prosper! Having said that, any other tips?

## Translating for the Silver Reeds

REFERRING to the letter from J. Platt regarding the Silver Reed printer EXP500 (Electron User, January 1985), I experienced similar difficulties for the first few days after my recent purchase but after some experiment I have overcome the problems.

Having put the printer in serial mode the sample basic programs in the printer manual (page 18 to 21) require "translation".

I found that substituting the character commands with VDU commands not only worked but were easier to write (reference to the top of

page 265 of the User Guide will help Mr Platt).

It is important to precede the VDU codes in the range 0 to 31 by VDU 1 as described at the bottom of page 14 of the Plus 1 guide. Failure to do this will result in odd printouts.

I have enclosed a sample translation of one of the programs in the printer manual (No. 7 - bold face print). So far I have not run into any other problems with the printer and the print quality is superb. - David H. Piper, Watford, Herts.

● Many thanks for your letter, Mr Piper.

```

10 VDU2
20 VDU1,27,1,13,00;
30 PRINT"SAMPLE OF ";
40 AS="BOLDFACE"
50 FOR N=1 TO LEN(AS)
55 FOR M=1 TO 3
60 VDU1,27,1,31,1,2;
70 PRINT MID$(AS,N,1);
75 NEXT M
80 VDU1,27,1,31,1,12;
90 PRINT MID$(AS,N,1);
100 NEXT
110 VDU3
120 END
    
```

## Joystick conversion

FOR all those who are sensitive about their Electron's keyboard, here's a joystick conversion program that allows you to use joysticks via a First Byte interface with Micro Olympics. — C. Dunkley, Nottingham.

● Thanks for the listing. The guys who wrote the program feel that it makes things a little too easy.

They also point out that there's no such thing as a standard joystick, so the game will vary in difficulty from player to player.

```
10 MODE6
20 REM
30 REM "MICRO OLYMPICS" -
  FIRST BYTES JOYSTICK conversion
  enter.
40 REM by C.Dunkley
50
60 FORN=0TO1
70 PT=4110
80 (OPTO:PHA:TYA:PHA:TYA
:PHA
90 LDA#FC00
100 CNP#123:BNE#1:LDY
#49:JMP#nn
110 .n CNP#119:BNE#1:LDY
#50:JMP#nn
120 .nr CNP#111:BNE#1:LDY
#51
130 .nn LOX#0:LDA#13:JSR
#FFF4
140 .ns PLA:TAI:PLA:TAI:P
LAR#T5:J
150 NEXT
160
170 REM If "BREAK" is pre
  ssed lines 170 & 180 will h
  ave to be re-entered.
180 REM in order to re-ini
  tialise the conversion rou
  tine.
190
200 %220=k10:%4221=k01
210 *%x14 4
220 STOP
```

## My choice

HERE's my list of BBC software which works on the Electron:

Frogger (A&F), Dare Devil (Denis-Vision), Meteors

(Acorn Soft), Cybertron Mission (Micropower), Moon-raider (Micropower) and Cowboy Shootout (Micropower).

All these games need no alterations to run successfully on the Electron. — Glen Morgan, Midhurst, Surrey.

## ... and mine

I AM writing to tell other Electron users of games for the BBC Micro which run on the Electron.

Versions of Dare Devil Dennis, Vortex, 3D Bomb Alley, Arcadians, Planes, Croaker, Aviator, Database, Birdie Barrage, Snooker, Danger UXB, Overdrive and Felix in the Factory all work.

They are all slower and the sound is not as good but they are playable.

Does anyone know of any Electron user groups in Bristol? I would like to boast some of my high scores on some popular games. They are as follows:

Position .....	405,385
Overdrive .....	22,485
Mr Whiz .....	5,028
Cylon Attack .....	2,028
Guardian .....	59,528

You may not believe the score on Position but it is true — well almost because I have a Power Software joystick interface and have redefined the fire key on method 2 which makes it rapid fire. — J.A. Gooding, Filton Park, Bristol.

## Base error

CAN I point out that there are a number of errors in the Base program of February's Electron User. I should know, because I wrote it.

Wherever there should be an OSLCI statement such as OSLCI "FX15" this is printed

as "FX15" without the OSLCI. This may possibly be because you printed the program from a BBC with Basic 1. — Mark Fenton, Bury.

● You're right, Mark, the OCLIs are missing from the listing. We must have used a Basic 1 BBC, but for the life of us we can't remember how or why.

Our apologies. The correct lines are given below:

```
490PROCdb1("NUMBER ?",1,V
POS=2,1):OSLCI"FX15":INPUTL
INE""A$
850CLS:PROCdb1("Decimal T
o Hexadecimal",1,1,1):PROCd
b1("NUMBER ?",1,4,1):OSLCI"
FX15":INPUTLINE""A$
910CLS:PROCdb1("Decimal T
o Binary",1,1,1):SUM=0:PROC
db1("NUMBER ?",1,4,1):OSLCI
"FX15":INPUTLINE""A$
1070CLS:PROCdb1("Hexadeci
al To Decimal",1,1,1):PROCd
b1("HEX NUMBER WITH 'A' ?",
1,3,1):OSLCI"FX15":INPUTLIN
E""A$
1130CLS:PROCdb1("Hexadeci
al To Binary",1,1,1):PROCdb
1("HEX NUMBER WITH 'B' ?",
1,3,1):OSLCI"FX15":INPUTLIN
E""A$
```

## Interesting effects

BECAUSE of the lack of the 6845 video controller on the Electron, it is impossible to use hardware scrolling.

Despite this, something must be doing the job. I wondered if there are any VDU 23 commands or memory locations which can be used to produce interesting effects, as described in the BBC Advanced User Guide.

I have only managed to turn the cursor on or off but not

alter the height or Hash rate. Could you give me any details on this subject?

Also I would be interested to know why the Electron slows down as the size of a Basic program increases. — S. Roberts, Wolverhampton.

## Acorn's answer

I WROTE to Acorn before Christmas about the Plus-1 I purchased and its incompatibility with existing software on the market.

If it was not for Electron User I would have kept having to remove my Plus-1 when certain games were loaded.

Anyway they sent me a short program, different to the one you published, which can be saved and loaded before these games.

```
10 #FX163,120,1
20 AX=6AA:ZX=400:YX=6FF
30 :600=USR#FFF4:AX=601
:AX?12=0
```

I would also like to say I agree with D. Fivearch of Tolsworth, Surrey about his comments on Elite which on the Electron with the same 32k memory as the BBC B is far inferior.

There is no colour, the planets look like a 50 pence piece and the most upsetting of all no Thargoids.

The game is also rather difficult because of lack of the joystick option that is offered on the BBC.

No galactic hyperdrive means that the game is only an eighth of the size it should be. Let's hope Acorn listens to our comments. After all we are the people who buy the software and hardware. — D.M. Bell, Manchester.

## With evil intent...

PAGE 6 of Acorn's Electron User Guide says: "Then press any keys you like on the keyboard — as many as you like — you cannot damage the computer whatever you press!"

As some unfortunate user will have found accidentally this is wrong. Type in the

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So

tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE.

The address is:

Micro Messages  
Electron User  
Europa House  
68 Chester Road  
Hazel Grove  
Stockport SK7 5NY.



following program, and just before you run it be ready to press Esc.

```
10 #MOTOR 1
20 #MOTOR 0
30 GOTO 10
```

I'm sure many are glad to have been near Esc – the horrible noise is the cassette tiling system's motor control switch bashing on and off very quickly.

Clearly a violent action in such a delicate piece of equipment. There must be some other instances of harmless commands pressed in that are supposedly safe, but will not "damage the computer whatever you press!" – **James Barclay, Doncaster, S. Yorks.**

● In point of fact what the guide talks about is pressing any key, not typing in a diabolically designed program. Anyway, it's the cassette that would suffer, not the computer itself!

## Only two Pluses

IN the news section of your February edition of *Electron User* it shows a picture and a write up of the Plus 3.

Does this interface fit around the Plus 1 so you can have both printer and disc interface? Also is there such a thing as the Plus 2 interface? – **Ian Arrowsmith, Brentwood, Essex.**

● The Plus 3 comes between the Plus 1 and the Electron, so you can still use the printer. If there is a Plus 2 on the way we haven't heard of it.

## Right on the ball

I HAVE recently purchased an Electron and I have one question to ask – "where are all the peripherals?"

How on earth do Acorn expect the Electron to keep up with competition – Sinclair and Commodore – when there isn't a disc drive, modem or even speech synthesiser for the Electron?

I have seen the Electron Plus 1 and would like to think that this is a sign of things to

come. – **Jo Castle, Nuneaton, Warks.**

● Where have you been Jo? There is a disc drive (the Plus 3), and there's going to be an RS232 to allow modems to be used. You'd be better off asking when the Sinclair and Commodore are going to have a built-in assembler or structured Basic.

## Wasted hours

AS a relative newcomer to programming I am actively trying to absorb as much as I can in the limited spare time that I have available.

This often means working into the early hours of the morning on my son's Electron – it's the only time he will let me on it!

I have been using your listings to improve my input skills and to try and learn something of how the programs work.

However my success rate in getting them to run is fairly low. This often leads to complete frustration around 2 o'clock in the morning because of some error message that I cannot untangle.

My youngest son would very much like to play the Farnyard Fun game listed on pages 33/36 of the February issue of *Electron User*, but I have come to a grinding halt with an error message informing me of a missing J at line 470.

I have checked the typing and that looks OK, and not knowing what the longer instruction means, I cannot fathom it logically.

I have tried inserting brackets on a less scientific basis, but that has not helped.

I know that typing errors on your part do creep in from time to time, and I wonder if this is the cause. Can you help please?

If this is the case, then I am going to be very reluctant to spend hours typing in listings in future in view of the risk of having to abort due to a typing error that I cannot resolve.

Could you not publish directly from a printer output, instead of re-typing? – **J.L. Young, Billericay, Essex.**

● First of all Mr Young, our listings are taken directly from

a printer output and have been since the magazine was first published.

Having said that we know that it's very frustrating when a listing doesn't work but it's nearly always caused by a typing error. On the (touch wood) rare occasions when there is a listing error you'll find the amendments in Micro Messages.

## Top scores

AFTER reading about the Killer Gorilla high-score I set about beating it. No chance!

So taking out the Hagship of my software collection *Cybertron Mission* by Program Power, I decided to try and achieve a good enough score to warrant tearing myself away from my Electron and writing to you, and at last I think I've done it.

Can anyone beat 29,570 – that's on the fourth level – also I have managed to clear 2.41 metres on the high jump in Micro Olympics. I have beaten the runner in the 100m by a clear second.

Other hopefully notable achievements include 5,060 on Swoop (P.P.), and 11,520 on Croaker (P.P.). So how about a Hall of Fame just for Electron users? – **Andrew Clark, Farnborough, Hants.**

## No conversions

COULD you tell me if there is such a thing as a Spectrum to Electron converter with which you can run Spectrum software on the Electron. – **Richard Usey, Leicester.**

● It's a nice idea but alas the answer is – no. There are enough problems converting BBC Micro programs to run on the Electron!

## User port information

COULD you find it in your hearts to print an article on machine code, and also what about following The Micro User's example and putting on a bodybuilding course?

That brings me to my question. I want to build a

robot to plug into the back of my Electron, but know nothing about the user port except it has an 18 volt power supply. Any information would be welcome. – **Scott Mitchell, Glasgow.**

● We are told that Acorn Customer Services can supply an application sheet on the Electron expansion socket.

The best way at the moment would seem to be to use a Plus 1 interface and plug into the ROM expansion sockets. Commercial devices will be available to do this.

## Rotating circle

I HAVE been searching high and low in books and magazines for a program in which a large circle will rotate.

Please can any genius out there work out a program to help me? – **Mark Frost, Weston-Super-Mare.**

● We are not sure exactly what you mean, but have little doubt that either Allen Plume's second animation article in February's *Electron User* or Roland Waddilove's Polygram in this issue will solve your problem.

## Confusion reigns

I SWITCHED my Electron on and was about to write a program. I typed OLD and pressed Return. I then typed 10 MODE 2 and pressed Return.

The cursor went to the next line but there was no "More Than" sign. I pressed Escape and nothing happened. I then pressed all the other keys and the only one that did anything was Break.

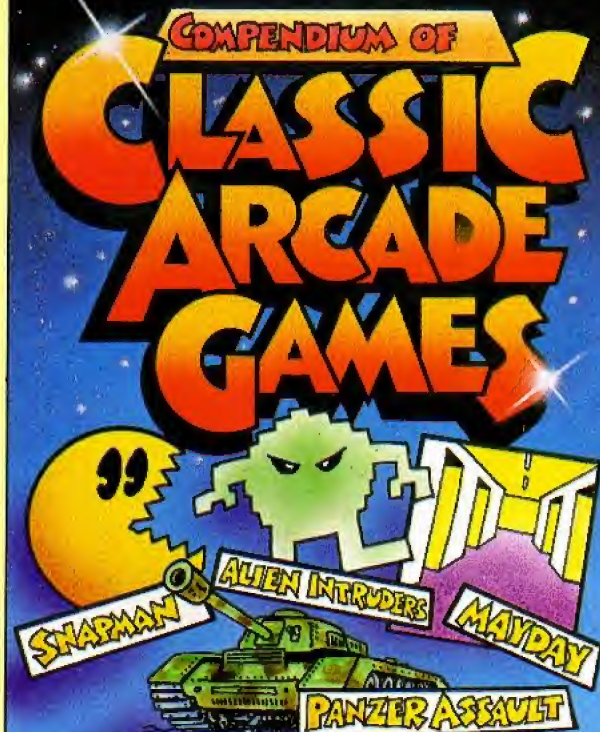
Why did the computer do this? – **Richard Taylor, Crowborough, East Sussex.**

● We suspect that after OLD you got a "Bad program" message that you haven't told us about.

What's happened is that you've confused the poor beast. You've said that there was a program in it but there isn't. Try NEW between OLD and 10 MODE 2 and you'll find things are OK.

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## On the February 1984 tape:

**NUMBER BALANCE** Test your knowledge of mental arithmetic. **CALCULATOR** Makes your Electron a calculator. **MULTI** Multi-coloured patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill as an astronaut. **POSITRON INVADERS** A version of the old arcade favourite.

## On the March 1984 tape:

**CHICKEN** Let computerised chickens test your nerve. **COFFEE** A satisfying word game from Down Under. **PARKY'S PERIL** Parky's lost in an invisible maze. **REACTION TIMER** How fast are you? **BRAINTEASER** A puzzling word game. **COUNTER** Simple arithmetic can be fun. **PAPER, SCISSORS, STONE** Out guess your Electron. **CHARACTER GENERATOR** Create shapes with little time.

## On the April 1984 tape:

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## On the May 1984 tape:

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## On the June 1984 tape:

**MONEY MAZE** Avoid the obstacles to get the cash. **CODER BREAKER** A masterpiece is needed to crack the code. **ALIEN** See little green men in the Electron Way! **SETUP** Colour scenarios without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT OUT** An eye-popping shooting game. **SMILER** Have a nice ride.

## On the July 1984 tape:

**GOLF** A day on the links with your Electron. **SOLITAIRE** The classic solo tape game. **TALL LETTERS** Large characters make sense. **BANK ACCOUNT** Keep track of your money. **CHARITIST** 32 programs. **FORMULATE** Awaits whimsies and angles.

## On the August 1984 tape:

**SANDCASTLE** The Electron seaside using. **KNOCKOUT** Battering balls batter birds with. **PARACHUTE** Kere the skydivers dry. **LETTERS** Large letters for your screen. **SPACE STRET** Test your spelling. **ON YOUR BIKE** Pedal power. **SCROLLERS** Names to your Electron. **SCROLLERS** Slides things slide sideways.

## On the September 1984 tape:

**HAUNTED HOUSE** Arcade action in the spirit world. **SPLASH** A logic puzzle for non swimmers. **SHORT SHOWS** How setup programs work. **SHORT TIME** The time may take. **STORM INVADERS** Multicoloured characters go to school. **SAILOR** Neutral and maths test. **TRY** out your mental powers.

## On the October 1984 tape:

**BREAKER** Classic arcade action. **ALPHASWAP** A logic game to stretch your brain. **SOUND GENERATOR** Tune the Electron's sound. **MULTI CHARACTER GENERATOR** Complex characters made simple. **RIGOL** 5000 characters. **MAYDAY** Help with your mouse with. **NOTEBOOK** Palindrome and string finding.

## On the November 1984 tape:

**STAR FIGHTER** Anti-aliased machines. **SCROLLER** Virg around machine code. **URBAN SAVVY** Government school game. **SPELL** Alphabetical education. **JUMPER** Level headed action. **CEASAR** Code breaking. **KEYBOARD** Typing game.

## On the December 1984 tape:

**CHRISTMAS BOX** Sort the presents logically. **SILLY SANTA** Sort out the multiple. **SNAP** Match the Animal pictures. **RECOVERY** The Bad Program message game. **CAROL** Interplay direct music. **AUTOPIA** A program that grows and grows. **NOTEBOOK** Simple string handling.

## On the January 1985 tape:

**SPACE BATTLE** Destroy the deadly invaders. **NEW YEAR** A sound and graphics greeting. **ESCAPE FROM SCARGOV** A logical action. **PIE CHART** Statistics made simple. **CLAYPIGION** An Electron wordplay. **ORGAN** Musical virtuoso piece. **NOTEBOOK** An original program. **RANDOM NUMBERS** 5000 random. **SNAKE** The old arcade action. **CHEESE** Race Beat 'n' milk.

## On the February 1985 tape:

**CRABAL** The meaty flying maze presents. **BOUNCY** A logically amusing action. **PAIRS** Can you remember the cards? **BASE** A logic puzzle. **CONNECTION** Utility. **CATCHER** Collect the eggs before they break. **CLOCK** Time keeping utility. **RACER** Grand Prix action. **NOTEBOOK** Graphics window. **TRIG** All the right angles.

## HOW TO ORDER

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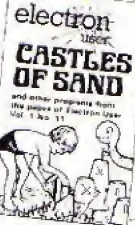
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**MR. FREEZE** Ice cube arcade action. **SCREENDUMP** Two procedures for printer dump. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Bear the burning fuse. **ANIMATION** Two example programs. **PIGS** Flying baron. **NOTEBOOK** Display formatting.

## On the April 1985 tape:

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# POLYGONS

Number of sides (3-9).....?  
Speed of rotation (1-9).....?  
Wobble (Y/N).....?



Another one.....?

# Give your graphics the poly-wobbles

## Making a polygon wobble by ROLAND WADDILOVE

**HAVE** you seen the spinning, tumbling spaceship in Acornsoft's *Elite* when the program has loaded? Amazing isn't it?

It was this that inspired me to write *Polygons*, a short program that can spin and wobble any regular solid polygon.

It's not a patch on the routine that *Elite* authors David Bell and Ian Braben have written, but for simple polygons is actually faster.

The program, although it may look very complicated, is actually quite simple and is based on an ellipse.

A cube when viewed end on looks like a square as the other five sides cannot be seen.

If you now rotate the cube the four corners will describe a circular path, see Figure I. In fact a circle can be drawn through the corners of any regular polygon.

Now try to imagine a circle at an angle - it will appear to be an ellipse. Draw a circle on

a piece of paper and tilt it and you will see what I mean.

The four corners of the top face of the cube when rotated now travel an elliptical path, as in Figure II.

So to draw a 3D perspective view of a cube all that is necessary is to pick four equidistant points on the circumference of one ellipse for the top face, and join them to four identical points on another ellipse for the bottom.

Thinking back to my school days, I dimly recalled that any point  $x, y$  on the circumference of an ellipse can be calculated using a bit of trigonometry, see Figure III.

I'll call the length of the major axis major, and the minor axis minor.

The equations are:

$$x = \text{major} * \cos(\text{theta})$$

$$y = \text{minor} * \sin(\text{theta})$$

Program I plots every point for  $\text{theta} = 0$  to 360 degrees.

If you try it you will find that

```
10 REM PROGRAM I
20 MODE 4
30 major=200:minor=50
40 FOR theta=0 TO 360
50 x=major*COS(RAD(theta))
60 y=minor*SIN(RAD(theta))
70 PLOT 69,x,y
80 NEXT
```

Program I

it's tucked away in the bottom left hand corner of the screen and only one quarter is visible. This is because it is drawn around the origin 0,0.

We need it in the centre of the screen so either the origin could be moved using VDU 29 or a constant could be added to the  $x$  and  $y$  coordinates.

Program II uses this second method to place the ellipse at 640,600.

By altering the two constants in lines 50 and 60 the

```
10 REM PROGRAM II
20 MODE 4
30 major=200:minor=50
40 FOR theta=0 TO 360
50 x=640+major*COS(RAD(theta))
60 y=600+minor*SIN(RAD(theta))
70 PLOT 69,x,y
80 NEXT
```

Program II

ellipse can be placed anywhere on the screen.

See for yourself. Just edit 50 and 60, replacing the two constants 640 and 600 with your own values.

As you have probably noticed, plotting every point is painfully slow.

Don't worry. As we progress it will get faster.

Program III draws the same ellipse but using DRAW rather than PLOT.

It is necessary to move to

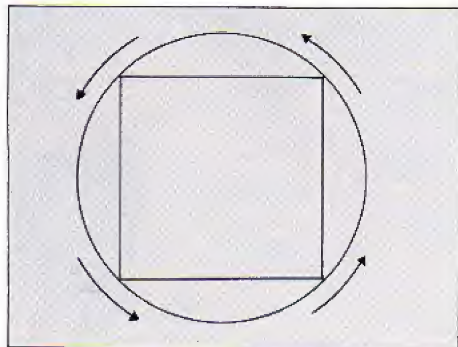


Figure I: Circular path of a cube's far corners

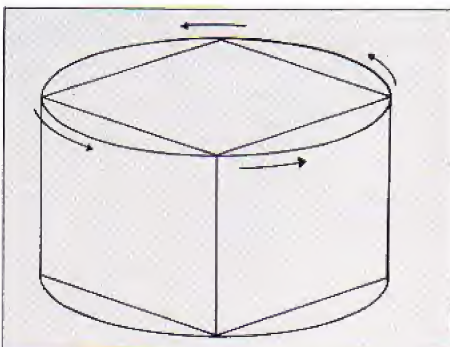


Figure II: Elliptical path when viewed from above



```

10 REM PROGRAM III      theta))
20 MODE 4              70 y=600+minor*SIN(RAD(t
30 major=200:minor=50  theta))
40 MOVE 040,600        80 DRAW x,y
50 FOR theta=0 TO 360  90 NEXT
60 x=640+major*COS(RAD(t

```

Program III

```

10 REM PROGRAM IV      60 x=640+major*COS(RAD(t
20 MODE 4              theta))
30 major=200:minor=50  70 y=600+minor*SIN(RAD(t
40 MOVE 040,600        theta))
50 FOR theta=0 TO 360  80 DRAW x,y
EP 72                  90 NEXT

```

Program IV

```

10 REM PROGRAM V      theta))
20 MODE 4              70 x2=640+major*COS(RAD(
30 major=200:minor=50 theta+72))
40 FOR theta=0 TO 288  80 y2=600+minor*SIN(RAD(
EP 72                  theta+72))
50 x1=640+major*COS(RAD(theta))
60 y1=600+minor*SIN(RAD(theta))
100 NEXT

```

Program V

the first point before drawing anything. To see why leave out line 40 and watch what happens.

The FOR/NEXT loop that we have used so far has 360 steps with theta being incremented by 1, the default STEP, each time round factually 0 to 360 is 361 but the first is the same as the last).

What would happen if there were only five steps - STEP 72, (360/5)? Only five lines would be drawn, a pentagon.

Edit line 50 in Program III to produce Program IV, which draws a pentagon viewed at an angle.

If we wanted a square then the step would be 360/4 or 90 since it has four sides.

Program V draws the same pentagon but in a different way. The coordinates of the first corner are calculated, x1,y1, then the coordinates of the next corner x2,y2.

The two corners are joined with a MOVE and DRAW in

```

10 REM PROGRAM VI      theta+72))
20 MODE 4              90 x3=640+major*COS(RAD(
30 major=200:minor=50 theta+72))
40 FOR theta=0 TO 288  100 y3=450+minor*SIN(RAD(
EP 72                  theta+72))
50 x1=640+major*COS(RAD(theta))
60 y1=600+minor*SIN(RAD(theta))
70 x2=640+major*COS(RAD(theta+72))
80 y2=600+minor*SIN(RAD(theta+72))
150 NEXT

```

Program VI

```

10 REM PROGRAM VII      theta+72))
20 MODE 4              100 x3=640+major*COS(RAD(
30 major=200:minor=50 theta+72))
40 FOR angle=0 TO 72   110 y3=450+minor*SIN(RAD(
P 6                    theta+72))
50 FOR theta=angle TO 288 x4=640+major*COS(RAD(
B+angle STEP 72        theta))
60 x1=640+major*COS(RAD(theta))
70 y1=600+minor*SIN(RAD(theta))
80 x2=640+major*COS(RAD(theta+72))
90 y2=600+minor*SIN(RAD(theta+72))
180 NEXT

```

Program VII

line 90. The loop limit is 288 as 288/72=360.

So we can now draw any polygon as if seen at an angle to the horizontal. Simply alter the size of the step in line 40.

For an n sided polygon the STEP is 360/n and the limit is 360-n.

A solid polygon has a top and bottom joined by straight sides. We can draw our pentagon anywhere on the screen by altering the constants added to the x and y

coordinates, so if we draw two, one beneath the other, and join the corners then we will have our solid. Figure IV. Program VI does this.

To spin the polygon all that is necessary is to move the first corner a little further round the ellipse, so instead of theta starting at 0 we could start at 5 or 10 or 15.

Each time it is drawn it will have moved round by that

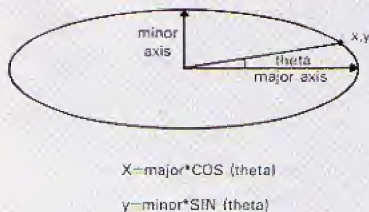


Figure III: How ellipses can be calculated

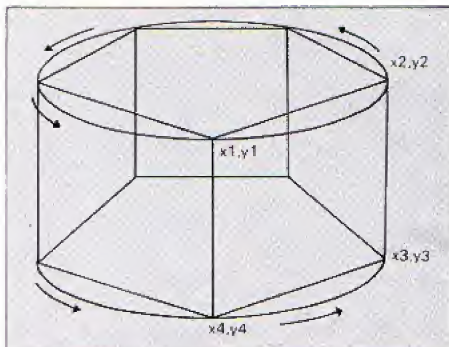


Figure IV: A solid pentagon

## From Page 55

amount. Program VII will spin the pentagon slowly in an anti-clockwise direction.

It can easily be altered to spin any polygon by altering the value of STEP and the limit.

The program as it stands is quite neat but far too slow. What we need is a bit of machine code to speed it up.

The final program uses Basic to calculate all the coordinates which are stored in a table starting at &3000.

The machine code then runs through this table, picking up the coordinates and uses VDU 25 to move and draw the lines.

The technique that Polygon uses is identical to program VII except that the minor axis is varied if the wobble option is selected.

I'll leave you to puzzle out how it works.

POLYGONS  
Number of sides (3-9).....?  
Speed of rotation (1-9).....?  
Wobble (Y/N).....?



Another one.....?

```

10 REM *** POLYGONS ***
**
20 REM *By R.A.Waddilow
e*
30 REM *For Electron Use
r*
40 MODE 4
50 PROCInitialise
60 REPEAT
70 PRINT TAB(5,4)*Number
of sides (3-9)*;FNdots;
80 PROCkey("3456789")
90 sides=VAL key$
100 angle=360/sides
110 ?data1=360/sides/6
120 ?data2=4*sides
130 PRINT TAB(5,6)*Speed
of rotation (1-9)*;FNdots;
140 PROCkey("123456789")
150 ?speed=VAL key$
160 PRINT TAB(5,8)*Wobble
(Y/N)*;FNdots;
170 PROCkey("yn")
180 PRINT TAB(16,17)*"Thin
king..."
190 AZ=&3000:YX=50
200 PROCdata1(-sides)
210 PROCdata1(-sides)
220 PROCdata1(sides)
230 PROCdata1(sides)
240 PRINT TAB(5,28)*Press
a key (and wait) to end ":
*FX21,0
250 VDU 20,10,23,29,13
260 CALL &900
270 PRINT CHR$(26);TAB(5,
28)*"Another one";FNdots;
280 PROCkey("yn")
290 UNTIL key$="n"
300 END
310
320 DEF PROCdata(VX)
330 FOR JX=0 TO (360/side
s)-6 STEP 6
340 YI=YI+(VX AND key$="y
")
350 FOR IX=JX TO 360-angl
e+JX STEP angle
360 cos=640+300*COS(RADIX
)
370 sin=SIN(RADIX)
380 cos1=640+300*COS(RAD
IX+angle)
390 sin1=SIN(RADIX+angle
)
400 ?AX=4:AX11=cos:AX13=5
36+YI*sin:AX=AX+5
410 ?AX=5:AX11=cos1:AX13=
536+YI*sin1:AX=AX+5
420 ?AX=5:AX11=cos1:AX13=
336+YI*sin1:AX=AX+5
430 ?AX=5:AX11=cos:AX13=3
36+YI*sin:AX=AX+5
440 NEXT
450 NEXT
460 ENDPROC
470
480 DEF PROCInitialise
490 #FX229,1
500 #FX11,0
510 #FX16,0
520 VDU 19,0,4;8;23,1,0;0
;0;0;
530 DRAW 0,1823:DRAW 1276
,1823
540 DRAW 1276,0:DRAW 0,0
550 PRINT TAB(11,1)*"P O L
Y G O N S"
560 address=&70:counter=&
72
570 count2=&73:temp=&74
580 count3=&76:speed=&77
590 data1=&80:data2=&81
600 oswrch=&120E AND &FFF
F
610 osbyte=&120A AND &FFF
F
620 PX=&900
630 I OPT 2
640 .code
650 LDA #&00:STA address
660 LDA #&30:STA address+1
670 LDA #4:STA count2
680 .loop3
690 LDA data1:STA counter
700 .loop1
710 LDA speed:STA count3
720 .wait
730 LDA #19:JSR osbyte
740 DEC count3:BNE wait
750 LDA #12:JSR oswrch
760 LDX data2
770 .loop2 LBY 00
780 LDA #25:JSR oswrch
790 LDA (address),Y:JSR o
swrch
800 INY:LDA (address),Y:J
SR oswrch
810 INY:LDA (address),Y:J
SR oswrch
820 INY:LDA (address),Y:J
SR oswrch
830 INY:LDA (address),Y:J
SR oswrch
840 CLC
850 LDA address:ADC #5:ST
A address
860 LDA address+1:ADC #0:
STA address+1
870 DEX:BNE loop2
880 DEC counter:BNE loop1
890 DEC count2:BNE loop3
900 LDA #129:LDI #0:LDY #
0:JSR osbyte
910 TYA:BNE code
920 RTS
930 J
940 ENDPROC
950
960 DEF FNdots=STRING$(34
-POS,".")*"?*CHR$(8)*CHR$(
7)
970
980 DEF PROCkey(a$)
990 REPEAT key$=CHR$(GET
OR 32)
1000 UNTIL INSTR(a$,key$)
1010 PRINT key$;
1020 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 61.





Can you spot a word that's the odd-one-out before the yacht sails across the screen? STEVE LUCAS sets the challenge

**THIS** game was written with the aim of being both educational and at the same time being fun to play.

It was originally intended for children from 7 to 11 years of age, but can be used by students of all ages if the words held in the data lines are changed.

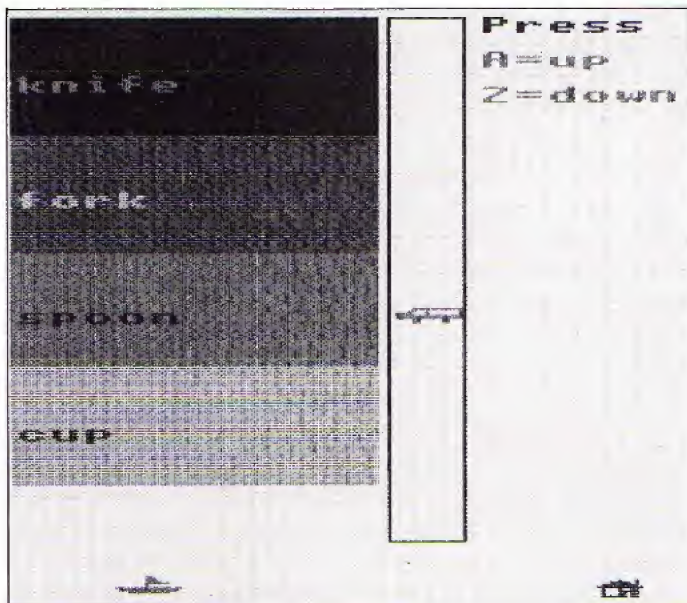
In it you are shown a series of questions, each consisting of four words displayed in boxes.

Three of these words are connected in some way and you must try to find the "odd man out".

To make life more difficult you must make your selection before a yacht sails right across the screen.

In case you think this is easy, each question you get right makes the yacht travel a little bit faster.

In order to select the out-of-place word move the lorry using the keys A for up and Z for down until it is next to the word you select. Then press the space bar.



## PROCEDURES

<b>PROCInstructions</b>	Gives instructions.
<b>PROCcursor</b>	Turns cursor off.
<b>PROCTitle</b>	Prints title graphics.
<b>PROCGuess</b>	Guess word.
<b>PROCa, PROCb, PROCc, PROCd, PROCe, PRO Cf, PROCG, PROCh, PROCi</b>	Print graphics.
<b>PROClose</b>	Get question wrong.
<b>PROTime</b>	Used for time limits.
<b>PROTime</b>	Get question right.
<b>PROError</b>	Error reports.

## VARIABLES

<b>AS</b>	Keyboard input.
<b>X%, Y%</b>	Coordinates for graphics.
<b>S%</b>	Score.
<b>Z%</b>	Graphics colour.
<b>FS, BS, CS, DS</b>	Words in each question.
<b>B%</b>	Number of correct answer.
<b>AA\$</b>	Keyboard input to move graphics characters.
<b>YY%, YZ%</b>	Check for previous graphics position.
<b>T%</b>	Set time limit.

Full listing starts on Page 58

# Odd One Out listing

## From Page 57

```

10 REM ** Odd Man Out ve
rsion 2 **
15 REM (C) Electron User
20 *FJ210,0
30 MODE 6
40 VDU19,0,4,0,0,0
50 ON ERROR MODE6:PROCDer
ror
60 PROCInstructions
70 PROCcurof
80 CLS:PRINT""Do you wa
nt sound (Y/N) ?"
90 REPEAT: AS=BETS:UNTIL
A$="Y" OR A$="N"
100 *FX11,1
110 IF A$="N" THEN *FX210
,1
120 TX=100
130 PROCcurof
140 REM ** DEFINE CHARACT
ERS **
150 VDU23,233,255,255,255
,255,255,255,255,255
160 VDU23,234,0,0,1,15,25
5,123,63,31
170 VDU23,235,0,27,128,22
4,255,110,252,240
180 VDU23,236,0,15,25,241
,255,255,12,12
190 VDU23,237,0,255,1,1,2
55,255,24,24
200 VDU23,238,130,195,193
,255,255,1,3,3
210 VDU23,239,0,0,128,248
,255,199,128,0
220 VDU23,240,0,3,15,31,0
,0,0,15
230 VDU23,241,136,232,248
,252,152,248,216,216
240 VDU23,242,1,1,1,1,1,2
55,127,31
250 VDU23,243,128,192,224
,248,0,255,254,248
260 VDU23,244,0,28,0,15,1
0,9,28,28
270 VDU23,245,48,12,12,25
0,59,72,156,28
280 VDU23,246,32,112,121,
127,63,125,128,32
290 VDU23,247,0,120,252,2
46,255,255,238,120
300 VDU23,248,255,144,255
,255,255,56,124,56
310 VDU23,249,255,9,255,2
54,255,28,62,28

```

```

320 VDU23,250,7,9,23,19,2
6,19,1,1
330 VDU23,251,224,144,232
,200,80,280,128,128
340 VDU23,252,0,15,15,12,
12,12,12,12
350 VDU23,253,0,240,240,4
8,48,48,48,48
360 VDU23,254,28,28,12,12
,60,124,0,0
370 VDU23,255,56,56,48,48
,60,62,0,0
380 REM ** DEFINE ENVELOP
ES **
390 ENVELOPE 3,4,90,-15,-
15,10,20,20,126,0,0,-126,12
6,126
400 ENVELOPE2,1,-7,7,0,10
,10,0,126,0,0,-126,126,126
410 ENVELOPE1,1,1,0,0,200
,0,0,126,0,0,-126,126,126
420 MODE 2
430 PROCcurof
440 PROCtitle
450 AX=0:BX=0:BX=0:CZ=0
460 *FX11,0
470 RESTORE
480 PROCguess
490 END
500 DEFPROCca
510 A$="Boat":VDU5:GCOL
0,12
520 MOVEXX,YX:VDU234,235
,4
530 ENDPROC
540 DEFPROCb
550 A$="Van":VDU5
560 GCOL0,ZX:MOVEXX,YX:V
DU236,237,4
570 ENDPROC
580 DEFPROCc
590 A$="Plane":VDU5
600BGCOL0,ZX:MOVEXX,YX:V
DU238,239,4
610 ENDPROC
620 DEFPROCd
630 A$="House":VDU5:GCOL0
,ZX:MOVEXX,YX:VDU240,241,4
ENDPROC
640 DEFPROCe
650 A$="Yacht"
660 VDU5:GCOL0,1:MOVE12
,40
670 VDU242,243:ENDPROC
680 DEFPROCf
690 A$="Bike":VDU5
700 GCOL0,ZX:MOVEXX,YX:V

```

```

DU244,245,4
710 ENDPROC
720 DEFPROCg
730 A$="Fish":VDU5
740 GCOL0,ZX:MOVEXX,YX:VD
U246,247,4
750 ENDPROC
760 DEFPROCg
770 A$="Bus":VDU5
780 GCOL0,ZX:MOVEXX,YX:V
DU248,249,4
790 ENDPROC
800 DEFPROCd
810 A$="Fido":VDU5
820 GCOL0,ZX:MOVEXX,YX
830 VDU250,251,10,8,8,252
,253,10,0,0,254,255
840 ENDPROC
850 DEFPROCtitle
860 PROCcurof
870 CLS:FOR YX=100 TO 100
0 STEP 150:TX=150-1:YX=1
00:PROC1:YX=900:PROC1
880 PROCcurof
890 NEXT YX
900 PROCcurof
910 VDU5:GCOL0,3:MOVE30
0,780:PRINT"Odd man out"
920 GCOL0,1:MOVE5,550:
PRINT"Steve Lucas 1984"
930 GCOL0,6:MOVE100,40
0:PRINT"for Electron User"
940 GCOL0,2:MOVE5,300:
PRINT"Press (space bar) to
start."
950 VDU5
960 PROCcurof
970 REPEAT UNTIL GET=32:
CLS:ENDPROC
980 REM ** turn off curso
r ... for Electron and BBC
with Q.S. 1.2 **
990 DEFPROCcurof
1000 VDU23,1,0,0,0:ENDP
ROC
1010 DEFPROCguess
1020 REPEAT
1030 CLS:AX=RD(20):FORK=
1040:READA$,B$,C$,E$,F,NEX
T:REPEAT
1050 READ F$,B$,C$,D$,E$,I
F:F$="X"THEN RESTORE:GOTO
1040
1060 GCOL0,1:MOVE0,400:M
OVE700,400:PLOT85,0,600:P
LOT85,700,600
1060 GCOL0,2:MOVE0,600:M

```

```

OVE700,600:PLOT85,0,600:P
LOT85,700,600
1070 GCOL0,3:MOVE0,600:M
OVE700,600:PLOT85,0,1000:
PLOT85,700,1000
1080 GCOL0,4:MOVE0,200:M
OVE700,200:PLOT85,0,400:P
LOT85,700,400
1090 VDU5:GCOL0,1:
1100 MOVE10,900:PRINTF$
1110 GCOL0,4:MOVE10,700:
PRINTF$
1120 GCOL0,6:MOVE10,500:
PRINTF$
1130 GCOL0,5:MOVE10,300:
PRINTF$
1140 VDU5
1150 MOVE1100,35:VDU240,2
41
1160 TX=0:PROCe
1170 GCOL0,6:MOVE720,100:0
RAW870,100:RAW870,1000:0RA
W720,1000:RAW720,100
1180 YX=740:YX=150
1190 TIME=0
1200 MOVE900,1000:PRINT"
Press"
1210 GCOL0,1:MOVE900,940
:PRINT"A=up"
1220 MOVE900,880:PRINT"I=
down"
1230 REPEAT:AA$=INKEY$(0)
1240 YX=YX:YX=YX:GCOL0
,1
1250 IF AA$="A" AND YX<30
0 THEN YX=YX+195 ELSE IF AA
$="A" THEN YX=YX+160
1260 IF YX>895 THEN YX=895
1270 IF AA$="Z" THEN YX=YX-
195:IF YX<260 THEN YX=100
1280 IFYX<150 THENYX=150 E
LSEIFYX>970 THENYX=970
1290 IFYX<>YX THEN GCOL0,
0:VDU3,0,233,233:GCOL0,1
1300 MOVEXX,YX:VDU236,237
1310 IF TIME>TX THEN TIME=
0:PROCmove
1320 UNTIL INKEY(1-74) OR I
X>1000
1330 IF IX>1000 THEN PROCD
ine:GOTO1370
1340 AX=0:IF YX>800 THEN A
X=1 ELSE IFYX>600 THEN AX=2
ELSE IFYX>400 THEN AX=3 EL
SE IFYX>200 THENAX=4
1350 IF AX=01 THEN PROCDwin
:GOTO1370

```



```

1360 PROCclose
1370 UNTIL FALSE
1380 DEFPROCmove
1390 MOVE1X,4:GCOL0,0:VDU
233,233
1400 1X=1X+4:GCOL0,1:PROC
e:=MOVE070,Y1:SOUND1,3,100,
10
1410 ENDPROC
1420 REM ** set the questi
ons **
1430 REM ** add extra ques
tions here if required **
1440 DATA pen,pencil,chalk
,window,4
1450 DATA cod,herring,toad
,salmon,3
1460 DATA box,tin,room,bac
ket,3
1470 DATA rake,plane,kite,
helicopter,1
1480 DATA cheese,chalk,egg
s,milk,2
1490 DATA boat,yacht,bus,s
hip,3
1500 DATA glove,hat,helmet
,hood,1
1510 DATA knife,fork,spoon
,cup,4
1520 DATA pillow,sheet,war
drobe,blanket,3
1530 DATA kitchen,bathroom
,lounge,shed,4
1540 DATA boot,head,ara,le
o,1
1550 DATA book,jug,magazin
e,newspaper,2
1560 DATA car,bicycle,lorr
y,van,2
1570 DATA oak,oar,ash,eim,
2
1580 DATA sparrow,thrush,b
at,magpie,3
1590 DATA hatch,rabbit,ken
nel,stable,4
1600 DATA pipe,tap,tank,sl
ide,4
1610 DATA duck,egg,hen,ost
rich,2
1620 DATA swim,paddle,bath
,build,4
1630 DATA bag,coat,briefca
se,suitcase,2
1640 DATA coat,scarf,glove
s,swimsuit,4
1650 DATA fry,roast,grill,
eat,4

```

```

1660 DATA orange,lemon,tan
gerine,red,4
1670 DATA doctor,brother,s
ister,father,1
1680 DATA port,airport,sta
tion,plank,4
1690 DATA rake,spade,shove
l,paint,4
1700 DATA soap,oil,water,v
inegar,1
1710 DATA pint,gallon,poun
d,litre,3
1720 DATA lion,snake,tiger
,leopard,2
1730 DATA nine,four,three,
pounds,4
1740 DATA leaf,branch,leaf
,trunk,3
1750 DATA jupiter,saturn,a
rs,moon,4
1760 DATA board,bench,stoo
l,chair,1
1770 DATA wheel,chair,chai
n,handlebar,2
1780 DATA boat,lake,sea,oc
ean,1
1790 DATA boat,helicopter
,jet,plane,1
1800 DATA cup,glass,goblet
,box,4
1810 DATA circle,square,ch
air,triangle,3
1820 DATA calf,cow,cat,bul
l,3
1830 DATA France,Germany,B
elgium,China,4
1840 DATA tulip,tree,daffo
dil,rose,2
1850 DATA letter,post,stat
e,hand,4
1860 DATA lake,pond,sea,sa
nd,4
1870 DATA lamp,switch,torc
h,headlight,2
1880 DATA slow,fast,quick,
help,4
1890 DATA oar,sail,swim,he
la,3
1900 DATA fir,oak,tulip,la
rch,3
1910 DATA gas,oil,coal,pip
e,4
1920 DATA USA,Canada,Mexic
o,Cheshire,4
1930 DATA yellow,pen,green
,blue,2
1940 DATA man,sailor,pilot

```

```

,driver,1
1950 REM *** add extra dat
a items here ***
1960 DATA X,X,X,X,1
1970 DEFPROCtime
1980 CLS:VDUS:GCOL0,2
1990 MOVE 5,1000:PRINT"Yo
u ran out of time":1X=1X+10
2000 PROCcurf
2010 GCOL 0,5: MOVE 50,50:
PRINT"Press <Space Bar>"
2020 PROCcurf
2030 *FX15,0
2040 1X=0:Y1=500:FOR 1X=1
TO 1200 STEP 200:2X=1X+1:PR
DC: NEXT :SOUND1,2,130,50
2050 PROCcurf
2060 REPEAT UNTIL GET=32
2070 CLS:ENDPROC
2080 DEFPROCwin
2090 *FX15,0
2100 CLS:2X=0
2110 VDU 5: FOR 1X=1 TO 12
00 STEP 200:2X=1X+1:Y1=1000
: PROCi
2120 Y1=100:PROCi
2130 NEXT
2140 GCOL 0,5
2150 MOVE 250,750
2160 PRINT" You win !!!"
2170 SOUND 1,1,1,0,0
2180 GCOL 0,6
2190 MOVE 10,270:PRINT"Pr
ess <Space Bar>"
2200 REPEAT UNTIL GET=32
2210 1X=1X-10: IF 1X<10 TH
EN 1X=10
2220 CLS: ENDPROC
2230 DEFPROCclose
2240 VDU4
2250 PROCcurf
2260 *FX15,0
2270 CLS:COLOUR1:PRINT"YOU
LOSE !!!"
2280 COLOUR 2: PRINT"1F"
2290 COLOUR 3: PRINT"2F"
2300 COLOUR 5: PRINT"3F"
2310 COLOUR 6: PRINT"4F"
2320 COLOUR 8:IF 1X=1 THEN
1X=5F ELSE IF 1X=2 THEN 1X
=5F ELSE IF 1X=3 THEN 1X=5F
ELSE IF 1X=4 THEN 1X=5F
2330 COLOUR 7:PRINT"7The
odd one out is '1X'"
2340 COLOUR 2
2350 PRINT"Press <Space Ba
r>":PROCcurf

```



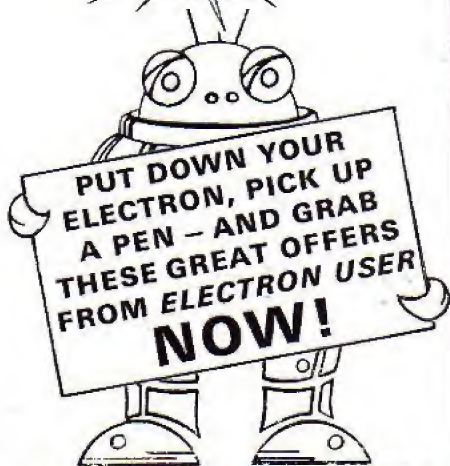
```

2360 SOUND1,2,150,50
2370 REPEAT UNTIL GET=32
2380 1X=1X+10:CLS:ENDPROC
2390 DEFPROCerror
2400 PRINT"1:REPORT: PRI
NT" at line "1:ERL
2410 REM ** turn off keybo
ard repeat **
2420 *FX12,0
2430 END
2440 DEFPROCInstructions
2450 PROCcurf
2460 CLS:PRINT TAB(14,1):"
ODD MAN OUT"
2470 PRINT" Steve Luc
as for Electron User"
2480 PRINT" In this game
you will be shown a series
of questions. Each question
consists of four words and
you must try "
2490 PRINT" to find the 'Od
d Man Out' before the yach
t reaches the right hand si
de of the screen."
2500 PRINT" You must then
move your lorry until it i
s next to the word you want
to select and press <RETU
RN>."
2510 PRINT" Use the followi
ng keys :-"
2520 PRINT" A = up"
2530 PRINT" I = down"
2540 PRINT" If you get it
right, the yacht moves f
aster !"
2550 PRINT" Press the <Spa
ce Bar> to start the game"
2560 REPEAT UNTIL GET =32
2570 ENDPROC

```

*This listing is included in this month's cassette tape offer. See order form on Page 61.*

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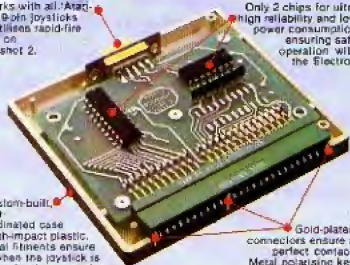
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## TEMPEST

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At last, a program for the BBC micro and Acorn Electron which faithfully recreates the arcade game of the same name. This is an official Atari-approved version of Tempest — the screen grids, the aliens, the colours and the style of play are all as close as possible to the arcade original. You are armed with a Blaster and a Super Zapper to defend yourself from the encroaching Flippers, Spikers, Flipper Tankers, Fuseballs and Pulsars which move along the grids of the storgate. There are 255 increasingly difficult levels of play, including invisible grids as you become more advanced. An excellent game, destined to become a 1985 top-seller, Tempest is available for the Acorn Electron on cassette, and for the BBC micro on cassette or disc.

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### OUR GUARANTEE

- (1) All our software is available before we advertise.
- (2) All our software is despatched within 48 hours by first-class post.
- (3) In the unlikely event that any of our software fails to load, return your cassette to us and we will immediately send a replacement.

THE SCREEN PICTURES SHOW THE BBC MICRO VERSION OF TEMPEST